ANNUAL REPORT
10-11

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Director's Statement:

Dear IMBS Colleagues and Selective UCI Administers,

Let me be candid; nobody, particularly me, likes to write reports. But a pleasant reward in composing the institute's annual report is how it provides a nice opportunity to review the advances and progress made by IMBS colleagues, visitors, and students over the last year. An outline of what has been accomplished, along with measures of success, is given in this introduction: Much more information and supporting details follow my comments.

IMBS (overview)

First, a word about our mission and faculty: Nowhere else in the world does there exist a research institute devoted toward matching the power of mathematical methods and reasoning with the difficult research challenges coming from the social and behavioral sciences. A way to think of the potential of this activity is in terms of the powerful symbiotic relationship between mathematics and the physical sciences; for over two millennia, advances in one discipline provided insights and tools leading to advances in the other. This reflects an explicit goal of the IMBS (and this is being done only at UCI), which is to develop a similar working relationship between the field of mathematics and areas of the social and behavioral sciences. More generally, we view our charge as fostering an interdisciplinary focus at UCI.

This objective colors our activities; it is why we host only interdisciplinary workshops, weekly colloquia series, conferences, and our several discussion groups. While much (but not all) of the leadership for these activities comes from senior faculty (six IMBS members, for instance, are in the NAS), we are encouraging other IMBS faculty to assume more active roles. This past year, for instance, we started working with those, primarily younger faculty, who wish to explore how the use of mathematics could advance their research programs. Currently this is being done through individual discussions with the intent of identifying which projects could be sharpened and expanded by using particular mathematical tools—and identifying possible collaborators from mathematics.

A related objective is to encourage younger IMBS faculty to become more involved in IMBS activities. We have, for example, two associate professors on our Executive Committee, two assistant and one associate professor on this year's (successful, see Section II F) search committee, and two associate professors working with our graduate program.

We also encourage younger IMBS faculty to play stronger roles in activities such as helping to design our conferences: An IMBS associate professor played a major role in our very successful January 2011 conference on network analysis.

Similarly, an assistant professor is taking a lead role in a conference scheduled for this coming October, and an associate professor is providing leadership for a January conference.

Measure of IMBS research, external funding

A crude measure of our research activity over the year is that IMBS members were on grants (some multiyear and multi-participants) involving over $66 million with about $9.5 million pending. The IMBS consistently and strongly encourages our members to obtain external research support; e.g., as part of this effort, last year we sponsored an open discussion session for IMBS members with a representative from the AFOSR. Also, "mentoring advice" is provided for IMBS faculty seeking a first

grant. While our main interest is to have our colleagues supported by external funds, and because (unfortunately) the IMBS staff consists of just our administrator (who is responsible for all IMBS activities), many of these grants have been processed through individual departments. Nevertheless, this sizeable amount of support nicely reflects the research activity that has been stimulated by IMBS.

Another measure of IMBS activity comes from publications and presentations of our members. Again IMBS is doing quite well; during the year just a portion of our members[1] published over 255 journal publications and gave over 200 invited presentations. (For more specific information about individual activity, I encourage you to read the Appendices of this report.) This has been, again, an active year!

Achievements of IMBS faculty

The strength of the IMBS derives directly from our members and their contributions. As such, let me recommend that in reading this report you start in Section II-D, **Summaries of Research Findings**. This section provides a sample of the wide variety of results that have been discovered over the last year by our colleagues. As a small illustration, these advances include Luce's empirical work that nicely supports his 2004 mathematical psychophysical theory, McBride's mathematical modeling of illegal networks of criminals and terrorists, Levin's (at Princeton, he spends at least one month each year at the IMBS) mathematical evaluation of the dynamics of biological diversity at all levels, Johnson's search for more explicit (statistical, mathematical) methods that can be used in linguistics, Naren's work on developing alternative (and more applicable) probability theories for the behavioral sciences, Brownstone's analysis of the new US vehicle fuel economy standards and Brueckner's study of the recent price collapse of the housing market, Komarova's extension of mathematical work explaining social norms and cooperation to understand aspects of cancer, Skyrms' use of game theoretic tools to advance our understanding of signaling whether in humans, machines, or animals, McGann's use of mathematical social choice theory to develop a new classification of political institutions, Falmagne's mathematical advancements of his "learning space" which led to a diagnostic test for mathematics that is being used by several major universities, Butts' new method for analyzing the behavior of complex social network models, and Eppstein's new and faster algorithm for listing all of the cliques in a social network. A surprising variety of deep, most useful results! In this illustration intended only to provide a flavor of . To see more, I encourage you see Section II D. (Also see Appendix E to learn about some of the prizes and honors received by IMBS members.)

Students

Following the recommendation of the 2003 external review committee, the IMBS assumed responsibility of the Mathematical Behavioral Science PhD program. (Louis Narens chairs this program.) Beyond students who are enrolled in our program, we decided to view our responsibility as extending to *any* qualified UCI graduate student who had an interest in using mathematics to advance knowledge in about any of the social, managerial, and behavioral sciences. (See Section III.) For this reason, for instance, our course "Methods and Models" (Narens and Saari) designed to help IMBS

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[1] The actual numbers are larger. To explain, faculty members are creatures of habit. So with our tradition of collecting report information around the end of August and with many colleagues off at research projects, international conferences, etc., this year's earlier deadline of August 1 meant that not everyone had an opportunity to reply. Nevertheless, what has been collected demonstrates the growing strength of the IMBS.

students enter into research regularly enrolls more non-IMBS students (several from the school of management) than IMBS students. The same is true for Social Dynamics (Skyrms, Narens, Saari).

To obtain feedback from faculty and to share advances with non-IMBS students, each year our IMBS graduate students organize a one-day graduate student conference. In keeping with the IMBS theme of including all, this conference attracts student participants from a variety of disciplines. (See Section III B.) Also, with our recently developed relationship with the Santa Fe Institute (SFI), this year three of our graduate students are participating in SFI summer activities.

For other events, along with our graduate student research prize, see Section III B. For activities with undergraduates, see Section III C.

Conferences, discussion groups

Each year the IMBS puts on widely recognized conference/workshops. (Videos of the talks can be found on the conference link of http://www.imbs.uci.edu.) This year, in part because of the growing and interdisciplinary importance of network theory (in areas ranging from health concerns, infectious diseases, economics, engineering, physics, sociology, to even an understanding of terrorist activities) and because some of the fundamental work on this topic was pioneered by IMBS faculty, "networks" was the theme of our January conference. More information, along with a list of participants, can be found either on the IMBS webpage or in Section IV.

In addition to our active colloquia series (Section IV E), IMBS members have
 organized and run around *25 research oriented seminars* (for the wide variety of these groups, see Section II B).

Our *Social Dynamics and Complexity Research* subgroup has a weekly series (that involves several other universities) along with an e-Journal,

our *Social Networks Research Group* has weekly discussion meetings and lectures (for a listing, see Section IV E), as does

our *Color and Cognition Reading Group*, and

our *Evolutionary Dynamics* group.

Information about their activities can be found in Section IV of the report; let me encourage you to read it.   If you are interested in creating a group, let us know; we will do what we can to help you.

Other information

For other information about the IMBS, such as letters from visitors about their experience at the IMBS, please check the full report.
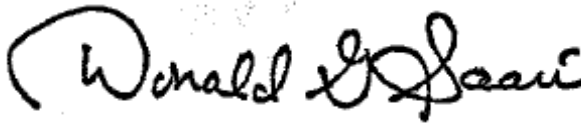
Summary

Although financial difficulties hit, limited, and affected what we did during the 2010-11 academic year, I am delighted to report that, nevertheless, the IMBS enjoyed a full and active year: We expect to do the same during 2011-12. As examples, invitations for two conferences are out and we currently are planning a third.   And, we already have received a suggestion for a 2012-13 interdisciplinary conference. Suggestions about other possible activities, as always, are welcomed!

As this report proves, the cost of the institute is very modest and very cost-effective, particularly considering the impact we have in terms of funding, our international reputation, helping to develop and promote new research approaches, our work with a wide range of graduate students, and the impact that the IMBS has been having on a variety of research fronts as outlined in this report. While it is not clear

what will be possible to accomplish during the 2011-12 academic year, we are hoping and already planning for the best.

To conclude, I am sure everyone in IMBS joins me in extending a deep and warm thanks to Janet Phelps; alone, she handles everything: visitors, scheduling, colloquia, conferences, discussion groups, committees, reports, helping to plan for the future, and so forth. She plays an important role in the success of the IMBS.

Sincerely,

Donald G. Saari
Director, IMBS

I. ORGANIZATION AND ADMINISTRATION

A. Administration

The Director of the Institute for Mathematical Behavioral Sciences is Professor Donald G. Saari. He reports both to the Dean of the School of Social Sciences and to the Vice-Chancellor for Research. An Executive Committee for consultation and decision-making regarding the long-term direction of the Institute assists the Director, (section B below).

The staff of the Director's office consists of an Administrator. Presently, some bookkeeping and personnel matters are being taken care of by the School of Social Sciences.

Director:	Donald G. Saari, 2003-present
Previous Directors:	R. Duncan Luce, Founding Director, 1989-1998
	William H. Batchelder, 1999-2003
Graduate Director:	Louis Narens
Graduate Advisors:	Marek Kaminski & Michael McBride
Administrator:	Janet Phelps

B. Executive Committee

Carter Butts, Associate Professor of Sociology
Marek Kaminski, Associate Professor, Political Science
Michael D. Lee, Professor and Chair, Cognitive Sciences
Mark Machina, Professor of Economics, UC San Diego
Stergios Skaperdas, Professor of Economics
Brian Skyrms, Professor of Philosophy

II. RESEARCH

A. Current Research Programs

The 65 members of the Institute for Mathematical Behavioral Sciences (IMBS) and their research interests are listed in Appendix A.

The IMBS is roughly partitioned into five research clusters. These are listed below and should be considered as informal intellectual groupings, rather than formal structures.

1. Measurement Theory, Foundational Issues, and Scaling Models: Barrett, Batchelder, Burton, Falmagne, Lefebvre, Luce, Maddy, Narens, Romney, and Skyrms

2. Statistical Modeling:
   Cognitive: Baldi, Batchelder, Dosher, Eppstein, Falmagne, Lee, Iverson, Riefer, Romney, Smyth, Steyvers, and Yellott
   Economic: Brownstone, Poirier, Saari, and Small

Sociological/Anthropological: Boyd, Butts, Faust, Freeman, and White

3. *Individual Decision Making:* Birnbaum, Keller, Luce, Machina, Narens, and Saari

4. *Perception and Psychophysics*:
   Vision: Braunstein, Chubb, DeFigueiredo, D'Zmura, Hoffman, Iverson, Palais, Romney, Sperling, Srinivasan, Wright, Yellott, Xin, and Zhao
   *Psychophysics and Response Times***:** Brown, Falmagne, Iverson, Luce, Narens, and Yellott

5. *Social and Economic Phenomena*:
   *Economics and Game Theory***:** Branch, Brownstone, Brueckner, Burton, Frank, Garfinkel, Komarova, Kopylov, Levin, McBride, Poirier, Skaperdas, Skyrms, Saari, and Small
   *Public Choice***:** Cohen, Glazer, Grofman, Kaminski, Keller, McGann, Taagepera and Uhlaner
   *Social Networks***:** Batchelder, Butts, Boyd, Chiang, Faust, Freeman, Noymer, Romney, and White
   Social Dynamics and Evolution: Butts, Johnson, Huttegger, Narens, Romney, Saari, Skyrms, Smyth, Stern, and White

B. Publications

The members who have replied report a total of 255 journal publications (published or in press) for the current academic year. These are listed in Appendix B.

The IMBS has a technical report series that is available to all members and qualified graduate students who are submitting a paper to a refereed journal or book. The series editor is Donald Saari. Appendix C lists the 7 technical reports issued during the academic year. Technical reports since 1993 can be found under "printed resources" on the Institute's web site at www.imbs.uci.edu.

C. Public Talks and Colloquia

IMBS members actively participated in numerous off-campus research seminars and conferences. The members who replied gave a total of 202 talks listed in Appendix D. Their awards and achievements for this year can be found in Appendix E.

D. Summaries of Research Findings

An important aspect of the Institute is the research conclusions developed by its members. What follows is a sample of what has happened this year.

Measurement Theory, Foundational Issues, and Scaling Models

Statistical Modeling

William Batchelder

My graduate students and I are developing several new Cultural Consensus Theory (CCT) models. One of the models treats 'cultural consensus' as a degree of truth, another model handles ordinal scale items. Most interesting is the development of CCT models for questions concerning ties in a graph. We impose

axiomatic constraints on the aggregated consensus knowledge represented in a graph (e.g. balance, equivalence relation, linear order), but we do not require the respondents to obey these graph axioms. We are anticipating the arrival of a post doc, Dr. Zita Oravecz from U. Leuven, who will help develop a user friendly software package to conduct Bayesian inference for CCT models.

Jean-Claude Falmagne

J.-Cl. Falmagne and Jean-Paul Doignon. (2010). Axiomatic derivation of the Doppler Factor and related relativistic laws. *Aequationes Mathematicae*, 80: 85—99.
Abstract: In the context of the relativistic Doppler Effect and the Lorentz-FitzGerald Contraction [LF], we investigate the consequences of two abstract axioms [R] and [M] expressed in terms of an abstract operation generalizing the addition of velocities and a particular function L that can represent either the Doppler effect or the Lorentz-FitzGerald Contraction. In words, these axioms state the following: [R] *iterating the function L has the same effect as adding a velocity*; [M] *adding a velocity via the operation preserves the order of the function*. We prove that these axioms are equivalent to each other, and also to generalized forms of the Doppler Effect and the standard expression [AV] for the relativistic addition of velocities, taken jointly. We also show that if [AV] holds, then the axioms [R] and [M] are inconsistent with [LF].

J.-Cl. Falmagne. Projections and symmetric expansions of a learning space. arXiv:0803.0575v1 [math-CO]. Accepted for publication in a volume honoring George Sperling. Expected publication: year 2012.
Abstract: Any proper subset of the domain of a learning space defines a projection of the learning space which is itself a learning space that is consistent with the parent learning space. Such a construction defines a partition of the domain of the learning space having each of its non trivial classes preserving some key properties of the learning space. Under certain conditions, each of the equivalence classes is essentially, via a trivial transformation, a learning space. The paper contains a direct proof of these and related facts which are instrumental in parsing large learning spaces, and so, essential for managing real life applications of these concepts.

J.-Cl. Falmagne and J.-P. Doignon. *Learning Spaces*. Interdisciplinary Applied Mathematics, Springer-Verlag, Berlin Heidelberg, 2011.
Abstract: Learning spaces offer a rigorous mathematical foundation for various practical systems of knowledge assessment. An example is offered by the ALEKS system (Assessment and LEarning in Knowledge Spaces), a software for the assessment of knowledge. From a mathematical standpoint, learning spaces as well as knowledge spaces (which made the title of the first edition) generalize partially ordered sets. They are investigated both from a combinatorial and a stochastic viewpoint. The results are applied to real and simulated data. The book gives a systematic presentation of research and extends the results to new situations. It is of interest to mathematically oriented readers in education, computer science and combinatorics at research and graduate levels. The text contains numerous examples and exercises, and an extensive bibliography.

Padhraic Smyth

We have developed a new family of statistical modeling techniques for modeling social network data over time. In particular, we have investigated models for networks of time-stamped events among actors, such as exchanges of emails or Facebook posts among sets of individuals. A computational problem

with statistical modeling such data in the past has been that estimation and prediction algorithms often scale as the square of N or exponentially in N, where N is the number of actors in the network, precluding the application of such models to networks where N is in the thousands or millions. We have developed a class of latent-variable models that scale linearly in the number of actors N and have demonstrated how these models can be fit to data sets involving tens of thousands of actors and communication events, and can generate much more accurate predictions compared to competing non-statistical approaches (see Foulds et al, 2011, and DuBois and Smyth, 2010). These types of modeling approaches and algorithms are becoming increasingly important tools for the analysis of very large "internet-scale" social network data. This is joint work with Ph.D. students Chris DuBois and Jimmy Foulds and with Professor Carter Butts.

Decision-Making

Robin Keller

Uncertainty-seeking behavior is currently understood as the result of loss aversion which motivates a preference for the possibility to avoid or lessen an otherwise sure loss. However, when choosing among negative options on behalf of others, Leonhardt, Keller and Pechmann (*Journal of Consumer Psychology*, in press) offer responsibility aversion as another possible motive for uncertainty-seeking behavior. Within our conceptual model, responsibility aversion is defined as the preference to minimize one's causal role in outcome generation. Compared to certain options, uncertain options lessen the decision maker's causal role in outcome generation because the outcomes are partially determined by chance. The presence of chance increases indirect agency on behalf of the decision maker and lessens his or her perceived risk of responsibility. The results of five studies support a responsibility aversion motivation behind uncertainty-seeking behavior.

Vladimir Lefebvre

During this year I have tried to use the reflexive game theory for modeling the processes of choice in small groups. I have studied the conditions, which do not influence a group member's choices. I formulated and proved several theorems. It came as a surprise that a necessary condition for a person's free choice is a conflict with at least one of the other members of a given group.

Duncan Luce

My continuing empirical collaboration with Ragnar Steingrimsson and, to a lesser degree, with Louis Narens has resulted in surprisingly successful empirical tests of a variety of predictions from my 2004 psychophysical theory. Two examples are, first, we have developed evidence for loudness and for brightness having subjective intensity is a ratio scale across pitch and hue, respectively. An open question, which has encountered some complication about laboratory facilities, is whether the same holds across these two modalities. We hope to have an answer in the coming year. Second, since S.S. Stevens' (1975) pioneering developments in the study of subjective intensity, there has been a strong tendency to treat them all as special cases of the same mathematical form, a power function with quite a range of exponents. I came to realize that it is very important to distinguish carefully between inherently binary (2-D) senses such as eyes and ears and unary (1-D) ones such as weight and length perception, money, vibration, etc. Even though each entails a concept of concatenation, they are quite different leading to somewhat different numerical representations and very different predictions about such things as properties of concatenation and cross-modal matches. A substantial empirical effort will be entailed to check these predictions.

Michael D'Zmura

We continue to study whether electroencephalographic (EEG) signals measured while one imagines speech provide enough information to identify what is being thought. EEG data from an experiment in which two syllables were spoken in imagination in one of three rhythms let one determine the rhythm with which syllables are produced with appreciably greater-than-chance performance. Sequential feature selection analysis of EEG data in a second experiment show that EEG can be used to discriminate among imagined words thought in the context of imagined sentences. Similar analysis of EEG data from an experiment in which single phonemes were produced in imagination shows highly significant discrimination of the phonemes from EEG signals. Finally, we have demonstrated that one may signal Morse code using a brain-computer interface sensitive to short and long syllables produced in imagination.

Rui de Figueiredo

Complex Computationally Intelligent Nonlinear Dynamical Systems-of-Systems (CCINLDSoS)
Prof. de Figueiredo has completed preliminary research work on a Hilbert Algebra A(a) over the field of complex numbers, where the objects a belonging to A are operators belonging to a Hilbert Product Space $G = F \times F \times \ldots \times F$, where F is a Reproducing Kernel Generalized (weighted) Fock Space of analytic functionals (expressed as abstract Volterra series) on a separable Hilbert Space H. In some instances, Bochner integration needs to be used, e.g., in definition of the scalar product.

The exciting aspect of this research is that a best approximation â to an object a in A can be obtained, in closed form, based on a finite set of observation functionals in G (with representers obtained by appropriate action on the reproducing kernel of F) in the form of an abstract spline in the sense of Sard. The closed form expression for such a spline allows its realization as an artificial neural network (ANN) or more generally as a Dynamical Functional Artificial Network (D-FAN). In short, the above approach provides an elegant abstraction for the solution of the problem of connectivity of modules in Complex Computationally Intelligent Non-Linear Dynamical Systems- of-Systems (CCINLDSoS's).

The other two abstractions needed to complete the overall abstraction for a CCINLDSoS are structure and functionality. These have been derived by using to a combination of attributed graph theory with nonlinear functional analysis.

This overall abstraction provides a solid foundation for the modeling, identification, and design/synthesis of complex nonlinear dynamical systems of systems. With such a foundation we have been able to rigorously model, identify, and design/synthetize for such systems, (a) at the input-output level, the process of adaptation using nonlinear ARMA models; (b) at the cognitive level, the processes of learning, with and without supervision, and evolution; and (c) at the intelligence level, the processes of understanding, discovery, and innovation (invention). Specifically, the above methodology has been applied to cognitive signal prediction. By a "cognitive signal" we mean a waveform or time series associated with a process requiring cognitive/perceptual skills. A vivid example of a cognitive signal is the speech signal in a conversation that involves understanding, by the recipient, of the content of the message from someone with whom the message recipient is talking. Most of the schemes for speech

signal prediction, like LPC (Linear Predictive Coding), are formulated based on speech production models. However, from the viewpoint of the listener, it is more reasonable to rely on generic models that are nonlinear and in the form of neural networks that are capable of learning how to intelligently and automatically predict signal samples as the signal rapidly evolves as a function of time. Based on such thinking, we have developed a multi-layer neural network predictor of the samples y(k) of a cognitive signal y(.), like the speech signal. Let f(W,.) denote the input-output map of such a neural predictor, where W represents the weight vector of the appropriate synapses occurring in the neural network structure. Then the predicted value <y(k+1))> of the signal sample y(k+1) is expressed by <y(k+1)> = f(W, [y(k)]), where [y(k)] = ((y(k-M+1), ..., y(k)) is the input vector to the neural network, and, at every step, the vector W of synapses is updated by an Extended Kalman Filter (EKF) predictor, which enables "fast and automatic learning" by the neural network, a characteristic of the human brain in processing conversation. Simulation results show that the proposed methodology leads to better performance than the well-known linear predictive coding (LPC) approach which uses the Levinson-Durbin algorithm for predictor design. I presented some of these results at an international conference in Romania which led to the publication of an invited paper by me in the Annals of the Romanian Academy of Sciences.

Donald Hoffman

The limbal ring of the eye appears as a dark annulus where the iris meets the sclera. Both width and opacity of the limbal ring are influenced by iris pigmentation and optical properties of the region. With age the limbal ring becomes less prominent, making it a probabilistic indicator of youth and health. This raises the question: Are judgments of facial attractiveness sensitive to this signal in a potentially adaptive way? Our paper in the Journal Evolutionary Psychology shows that the answer is yes. For male and female observers, both male and female faces with a dark and distinct limbal ring are rated as more attractive than otherwise identical faces with no limbal ring. This result is observed not just for upright faces but also for inverted faces, suggesting that the limbal ring is processed primarily as a local feature rather than as a configural feature in the analysis of facial beauty.

Geoff Iverson

Over the past two or three years I have become critical of recent seemingly important innovations in methodology and cognitive psychology, in particular the statistic Prep and the introduction of quantum mechanical notions in cognitive theory. The paper, (Geoffrey J. Iverson, Michael D. Lee and Eric-Jan Wagenmakers (2010). The random effects *p*rep continues to mispredict the probability of replication *Psychonomic Bulletin & Revie, 17 (2), 270-272),* drives home the final nail in the coffin of Prep; the talk at the 2010 Mathematical Psychology meetings in Portland OR is but the first salvo in the battle against quantum cognition.

Kimberly Jameson

Significant research advances were made during 2010-2011 on issues related to how individual variation in the processing of environmental color impacts (a) the sharing of human color communication systems, and (b) the evolutionary dynamics of color meaning systems, (c) the role of structured network interactions on the sharing of information and meaning. These advances were largely the product of (i) modeling and comparative analyses of color vision behavior, genetics and neural processing in animals and humans, and (ii) findings from simulation investigations using artificial agent color category learning and shared categorization evolution (with N. Komarova, UCI Mathematics and with S. Tauber and L. Narens, UCI Cognitive Sciences). In addition, data collection was completed on an empirical

investigation of mathematical modeling of the individual neural processing of facial expression of emotion.

Other significant progress made includes development of new projects that extend the research progress from earlier years. For example, in preparation for the culmination of the NSF funded project (2007-2011) on color category evolution, considerable research effort has recently been spent developing research plans for new projects, and working on grant proposals that were submitted during 2010-11 academic year. Among these were new projects that extended the work of Jameson and Komarova into the domain of color communication in human-robot interactions, and include new collaborative work related technical issues concerning color detection in autonomous robotic systems with P. Goebel (Stanford's Center for Advanced Study in the Behavioral Sciences). This new AI oriented work also dove-tailed nicely with the NSF CDI project headed by Louis Narens, Cognitive Sciences, and was included in that submitted proposal as a focus on evolutionary game theoretic aspects of color signaling and communication research. In addition, an independent proposal with Jameson as PI and N. Komarova (UCI Mathematics) and P. Goebel (Stanford's Center for Advanced Study in the Behavioral Sciences) was submitted to the Social-Computational Systems (SoCS) program at NSF. While these proposals were favorably reviewed, neither of these new projects won an award, and both will be rewritten and submitted to different programs in the near future.

Continuations of empirical and theoretical work in the domain of facial expression of emotion (with N. Alvarado) and into the behavioral and perceptual consequences of opsin genotype variation is on-going.

Finally, still another newly embarked upon project that continues to develop is the genotype-phenotype studies of color perception behaviors in sub-Saharan African linguistic populations. This work has found very promising results in the initial analyses, and is currently under further development to extend data analyses and continue with further data collection in the field. Collaborators on this project are Sarah Tishkoff (Project Lead) at the Penn University, and Evan Daugherty, also at Penn University.

Lisa Pearl

One set of important findings concerns the biological underpinnings of the human language faculty. The knowledge of how to use one referentially in English (e.g., Look - an important finding! Here's another one!) is one linguistic example previously thought to implicate innate knowledge of language in humans. Specifically, since experimental data demonstrates that young infants seem to have correct intuitions about how to interpret one, it was thought that only by having innate knowledge of how to interpret one could children learn this knowledge as quickly as they do. However, my mathematical model demonstrates that this is not necessary - the same behavior can be generated by using probabilistic learning abilities applied to infants' linguistic input. In addition, the modeling work highlights that acquisition of the adult intuitions may in fact be a two stage process, with the experimental data available marking the end of the first acquisition stage rather than the end of both acquisition stages.

Another finding in a similar vein involves the structure of linguistic dependencies, such as "What do you think convinced them?", where "what" seems to be understood also as the subject of the embedded clause "convinced them". Adult intuitions about the full range of grammatical and ungrammatical linguistic dependencies were thought to require innate knowledge of language in humans. However, a mathematical model based on very simple premises (none of which involve innate knowledge of

language) can produce the observed adult intuitions. This suggests that knowledge of linguistic dependencies is not something that must be part of a biological endowment for language in humans.

A third finding involves human knowledge representations of language. In particular, I tested the validity of formal theories of knowledge representation about word-level stress (i.e., EMphasis vs. emPHAsis) by using mathematical models of language acquisition. Many theories of knowledge representation are based on trying to compactly represent the constrained variation present in the world's languages. Implicitly, they're also meant to make the problem of native language acquisition easier for a child - if children have knowledge of these representations as part of their innate biological endowment for language, acquisition should then occur more easily. However, this implicit assumption has rarely been explicitly tested. My research finds that one prominent proposal for the representation of word-level stress does not in fact make native language learning easier without additional language learning biases present in the child. This suggests that other representations may be preferable as an accurate description of human knowledge if they are able to both make acquisition easier and capture the constrained variation seen in the world's language systems.

A fourth finding involves how people use language to communicate in text. In particular, this work seeks to identify writeprints for individuals, which are unique combinations of characteristics that mark people's writing styles. Writeprints can be used to identify cases of authorship deception. For example, suppose someone is attempting to conceal their identity (perhaps by posting anonymously online or stealing someone else's user account and posting under that person's name) - our current models achieve an 89% accuracy rate at detecting this deception (i.e., 9 out of 10 times, we can tell if it's you doing the writing or not). These writeprint-based models can also be used to identify imitation attacks, where someone consciously attempts to alter their writing style to match yours and pose as you. Our current model can tell imitators from the real thing 100% of the time, based on current realistic samples of imitation attacks.

Ramesh Srinivasan

The overwhelming thrust of brain research has emphasized localization of brain function. This effort has had limited theoretical basis – empirical findings are localized and the dynamic and functional properties of neurons in these areas are simply believed to be specialized. My research emphasizes the idea that at a macroscopic scale, i.e., populations of neurons, functional properties of neurons are emergent mainly as a consequence of the connectivity of neurons in each area. Ongoing work in the lab seeks to connect the empirical evidence of brain networks we are uncovering to large-scale mathematical models of the whole brain.

Jack Xin

Jointly with students, postdocs and coworkers, (a) I studied flame speeds asymptotics in turbulent combustion models to understand the flow (wind or fluid vortical motion) induced speed growth, a fundamental problem in internal combustion engine. (b) I studied sparse blind source separation of chemical compounds arising in nuclear magnetic resonance (NMR), of sound mixtures and related noise reduction. These are discrete inverse problems to recover source signals from received or measured mixture data. The problems have no unique solutions in general unless certain regularization or sparseness is present. They are matrix analogues of integer factorization into products of prime numbers.

Social and Economic Phenomena

(a) Economics and Game Theory

William Branch

The Great Recession of 2008-2009 featured very low rates of inflation and a large economic contraction. In response, the Federal Reserve aggressively lowered interest rates, eventually bumping up against the zero lower bound on nominal interest rates. Since interest rates cannot go below zero, this hindered the effectiveness of monetary policy. An increasingly popular proposal to avoid hitting the zero lower bound in future recessions is for the Federal Reserve to target a higher average inflation rate thereby providing more room for the central bank to lower interest rates. Most research suggests that there is a tradeoff between the stability of higher inflation targets – which make hitting the zero lower bound less likely – and the inefficiency of inflation. However, the stability results that arise in the literature assume that the Federal Reserve is able to perfectly communicate their long-run inflation target and that households and firms completely understand the implications of that target when making economic decisions. In recent research, I re-examine the stability of higher inflation targets in an environment with imperfect information. I find that higher inflation targets lead to economic instability as households and firms may occasionally misinterpret temporarily higher (lower) inflation as a change in the Federal Reserve's inflation target.

David Brownstone

I have been working on a project to analyze the new US vehicle fuel economy standards. These standards require knowing very detailed information about vehicle attributes such as weight, horsepower, etc. As a result, there is no way to exactly identify vehicles chosen by households from standard household survey techniques. We have therefore developed statistical techniques to deal with this uncertainty and applied these techniques to estimate the demand for hybrid fuel vehicles purchased between 2006-2009. We find that the impact of uncertainty in vehicle identification is large (resulting in increasing confidence bands by a factor of more than 4 in some cases), but we are still able to find that households have a strong preference for higher fuel economy but also have a strong aversion to hybrid vehicle technology.

Jan Brueckner

The spectacular recent run-up in US housing prices, along with the subsequent price collapse, are watershed events in real-estate history. Many people believe that the growth of subprime lending (where loans are extended to borrowers with bad credit) fueled this housing boom. But a recent coauthored paper of mine investigates the reverse causal chain. The paper posits that subprime lending was itself *caused by* favorable price expectations, with higher expected future prices easing lenders' concerns about mortgage default, making it acceptable to offer loans to risky borrowers. The resulting boost to housing demand then feeds back onto prices, validating the initial favorable expectations. Our paper builds a model to illustrate these channels, and then carries out an empirical test. The test shows that rapid past price appreciation in a state (a proxy for expectations about future prices) pushes down the average credit ratings of new mortgage borrowers, as predicted by the theory.

Natalia Komarova

I have been working on several areas at the interface between mathematical and life sciences. (1) I have continued to work on mathematical modeling of cancer, focusing in particular on spatial modeling of cellular competition and regulation. This includes problems related to the oncolytic viruses - a type of viruses that can specifically attack and kill cancerous cells. Spatial predator-prey type dynamics which governs the interactions between cancerous cells and the virus, are characterized by complicated spatial patterns. Another problem is related to the intricate ways in which stem cells are regulated in healthy and cancerous tissues. (2) I also worked on topics related to Alzheimer's disease. In particular, I designed a method of extracting the mean and the variance in Alzheimer's disease stage duration from very sparse patient datasets. This enabled us to identify the existence of two groups of Alzheimer's patients, which we termed "rapid" and "slow" progressors. (3) I have also looked into cooperation in spatial systems of cells (or organisms). The main problem was to understand under what circumstances cooperation accelerates evolutionary change. (4) I have also worked on stochastic models of cell mutations, under various growth conditions. What kind of growth laws can minimize the accumulation of dangerous mutations in tissues?

Igor Kopylov

I (jointly with J. Miller from Bocconi University) have developed an experimental design to test relationship between memory and subjective willingness to bet money. Using memory interference, we are trying to check how imperfect memory affects subjective probability evaluation and ambiguity aversion. The working hypothesis is that memory decay should make a typical person more ambiguity averse. Yet it is also possible that imperfect memory will be consistent with probabilistic sophistication. So the data that we are collecting can add some useful insights to theory.

Michael McBride

In one of my projects I have been studying intervention in "dark networks," which are covert and illegal networks of criminals or terrorists. The interventionist (government, military, etc.), when making its decision about which actor in the dark network to remove, only has partial information about the structure of the network. The work has been theoretical and experimental. My co-author and I can show in a simple stylized model that the optimal intervention is a hybrid between the random attack and perfectly targeted attack that have been considered in the literature. Our experimental results show that subjects do, in fact, use an intervention strategy qualitatively similar to that predicted by the model.

Louis Narens

During the past year, my research has focused on three areas corresponding to three extramural grants from NSF and AFOSR: Psychophysics (Luce PI, Narens and Steingrisson Co-PIs), game-theoretic evolutionary modeling of categorization (Komarova, PI, Jameson, Narens, and Steingrisson Co-PIs), and the development of alternative probability theories for the behavioral sciences (Narens, PI, and Skyrms Co-PI). This has resulted in publications during the year of two new articles (Luce, R. D., Steingrimsson, R., \& Narens, L. (2010). Are Psychophysical Scales of Intensities the Same or Different When Stimuli Vary on Other Dimensions? Theory with Experiments Varying Loudness and Pitch, Psychological Review},117, 1247--1258; Narens, L., (2011). Probabilistic Lattices: Theory with an Application to Decision Theory. E. Dzhafarov and L. Perry, Eds, Descriptive and Normative Approaches

to Human Behavior, 161--202.), one new book chapter (Narens, L., Jameson, K. A., Komarova, N. L., & Tauber, S., Language, Categorization, and Convention. To appear in Advances in Complex Systems), and two new articles in submission. However, most of my research effort has been devoted to my book manuscript, Probabilistic Lattices and Logics, which is the major part of the AFOSR grant. This research investigates new approaches to uncertainty. Many in the behavioral sciences who directly study the matter believe that probability as defined and used in mathematics is inappropriate for describing how people understand and behave in situations involving uncertainty. The alternatives that have been suggested in the literature are generally weights for disjoint events whose only relationship to probability is that they add to one. My approach develops new probabilistic structures that are rich mathematically and useful in behavioral and philosophical applications.

This year, in addition to regular AFOSR funding, Skyrms and I have received two supplemental awards from AFOSR: a $100,000 award for me to continue my research for my book and for Skyrms to continue his research on counterfactual reasoning. We have also received a $70,000 award from AFOSR to have the postdoctoral student, Willemein Kets , work with me on integrating her research on knowledge with one of my alternative probability theories. I am also a Co-Principal Investigator with Graciela Chinchilinksi of Columbia University on an AFOSR proposal for an international workshop on "Catastropic and Rare Events: Managing Risks & Updating Beliefs," which has been recommended for funding by the Program Officer, but I have not heard of a final decision.

Over the last several years, two research groups within IMBS developed evolutionary game-theoretic approaches to language: One stemming from Brian Skyrms research on the social contract and based on signalling systems (LPS/ IMBS faculty Skyrms, Barrett, and Huttegner) and one stemming from Jameson's research on color categorizaton (IMBS faculty Jameson and Steingrisson, IMBS/Cognitive Science faculty Narens, and IMBS/Mathematics faculty Komarova). Brian Skyrms formulated a plan for combining these two strands of research into an ambitious project that through computer simulation simultaneously evolves language, individual and social knowledge, and social structure. During part of last year and the rest of this year we are actively pursuing extramural funding for this interdisciplinary project.

Dale Poirier

My research continues in applying Bayesian techniques to econometric models.

Donald Saari

Over the last year, a major portion of my research has concentrated on the "divide and conquer" reductionist approach used so often in all sciences, including the social and physical sciences. This is the approach where, to handle the complexities of a problem, it is divided into more manageable parts. After the parts are analyzed, the goal is to reassemble these answers into a "whole." I proved a general result showing that, in general this approach fails. The motivation for my result came from Arrow's Impossibility Theorem, which can be interpreted as demonstrating the impossibility of always being able to discover the societal ranking by trying to construct it in terms of "parts," the paired comparisons.

One paper was published showing how this "divide and conquer" difficulty explains several problems in engineering, another is coming out doing the same with economic organizational design. Other work

is based on recognizing that this divide-and-conquer methodology is the source of some the complexities associated with "dark matter" in astronomy. A current effort is to find ways to circumvent these identified difficulties. Here, an ultimate and widely used approach throughout the social sciences, paired comparisons, was adopted as a "model setting" and carefully analyzed. By doing so, a new "coordinate system" for data was constructed. One of the coordinate directions turns out to be the source of all of these difficulties. Current efforts are being made to develop mathematical techniques that will permit finding similar symmetries in other settings.

Kenneth Small

Statistical analysis of data on gasoline consumption, amount of travel, and congestion formation has succeeded in disentangling several behavioral responses of U.S. motor vehicle users to incentives. The analysis confirms earlier results that people respond to the fuel cost of driving by getting more fuel-efficient vehicles and driving less, and that the latter effect declines quite strongly with increasing incomes. The analysis also shows that building new highways causes people to drive more, and succeeds in separating two types of such responses: that due to more opportunities (by expanding the extent of the road network) and that due to lessening congestion (by expanding the capacity of roads in congested urban areas). These various responses are linked by how the amount of travel affects congestion, and for this reason they are measured more accurately in a model that considers all these decisions, as well as congestion formation, to occur simultaneously.

(b) Public Choice

Marek Kaminski

I continue to work on extending the principle of backward induction to a larger class of games than finite games of perfect information. Preliminary results show that such an extension is in fact universally possible for various types of strategies and for games that admit incomplete information, a continuum of actions, and infinite play. The entry for the Encyclopedia of Operations Research and Management Science summarizes our present understanding of backward induction.

Anthony McGann

I had an article accepted in Comparative Political Studies that proposes a new classification of political institutions based on (formal) social choice theory rather than ad-hoc assumptions (as is the case of most of the current work). Unlike the current work, this model correctly predicts which countries are most able to reform welfare states. In short, most existing work predicts that multi-party coalition governments should be prone to gridlock, whereas social choice theory suggests they should be highly responsive to changes in public opinion. The paper argues that it is essential for people interested in practical questions in comparative political economy (such as the size of the state and welfare state reform) to take into account the formal theory of majority rule and, in particular, the uncovered set.

Follow up work in comparative political economy involves developing a time-series measure of public opinion. The difficulty here is that while there are many suitable survey questions asked, the same questions are not asked every year. I have developed a estimator based on item-response theory to deal with this. I am currently working on a grant for data collection.

Rein Taagepera

A main concern of mine has been overuse of statistical approaches at the expense of logical models to express causal processes and guide what to measure and how to process data before pushing the statistics button. There is little point in applying linear fit to what can be expected to be a linear relationship; or applying methods assuming normal distribution when this is not the case; or plugging separately into regression several inputs that logically follow from each other. Regression results are all too often reported so incompletely (omitting mean, median and range) that they cannot be used for any further work -- they are dead on arrival in printed page. I have presented ways to improve on the situation in *Making Social Sciences More Scientific: The Need for Predictive Models (*Oxford University Press 2008). A 2010 manuscript, *Logical models in Social Sciences: How to Begin*, expands on the hands-on side. An article in *European Political Science* 2011, "Adding Meaning to Regression", reproduces some basic requirements, such as "Always graph the data" and "Graph more than the data!" to include logical boundary constraints as a starting point for logical model building. A forthcoming coauthored article applies these approaches to policy outputs of various electoral systems.

Carole Uhlaner

The paradox of voting is one particularly puzzling manifestation of the collective action problem. Most reasonable analyses conclude that almost all rational individuals in normally large electorates would abstain, but in fact substantial numbers vote. My theoretical work has developed an explanation for this behavior based upon the interplay between individual citizens and elites who are seen as representing them. Given that race, ethnicity, and gender identities are salient in contemporary U.S. politics, one implication of the theory is that turnout will be higher among women and ethnic minorities when and where there are more female or coethnic political elites. My empirical work has supported this, both the work on Vietnamese Americans in Orange County and the work on the relationship between turnout and the composition of U.S. state legislatures.

(c) Social Networks

Michael Burton

Since my retirement I have been working on two projects. The first is relevant to the IMBS, but has not yet resulted in a publication. This is the development of a course, and a related text, on the uses of statistics in anthropology. In the past two years I have been developing and teaching the course to UCI's PhD students in anthropology. In the next year, I will be turning the notes into a draft of a book.

The second project is a continuation of my long-term interest in the options that Pacific Islanders will have for responding to climate change. That will involve the uses of data from climatology to assess how different Pacific Islands will be affected by change, and the uses of knowledge from anthropology to think through questions as to what Pacific Islanders can do to plan for their responses to climate change.

Carter Butts

In a forthcoming paper in the journal *Sociological Methodology*, I describe a new method for analyzing the behavior of complex social network models. As a result of substantial theoretical, empirical, and computational advances, researchers can now model the relationships among persons, organizations, and other entities with a much higher level of detail than was previously possible. These models are important for telling us how information and disease spread, which organizations will work together during times of crisis, and even how companies like Facebook can optimize their computer systems to serve customers more cheaply and efficiently. Unfortunately, these new network models are often quite complex, and can be difficult to study. The approach introduced in my paper uses techniques from random graph theory (a branch of mathematics dealing with stochastic models of network structure) to find simple, easily studied models that "bound" the behavior of more complex ones. Using these techniques, it is possible to predict the behavior of a complex network model in circumstances when this would otherwise be infeasible (e.g., for very large populations). Among the applications described in the paper are identifying conditions for inhibiting the spread of epidemics within sexual contact networks, and modeling the number of persons potentially reached by an important message (e.g., in an emergency) spread by word of mouth. These and other uses of this new technique illustrate how the mathematical social sciences contribute to our ability to solve real-world problems that affect the health and safety of the public at large.

David Eppstein

With Maarten Löffler and Darren Strash, we found a new fast algorithm for listing all of the cliques in a social network, subsets of people who all know each other. Finding cliques is, in general, an NP-hard problem but the low number of edges in social networks relative to their number of nodes allows the problem to be solved quickly in this case, even for large social networks with millions of nodes. We presented a theoretical analysis of our new algorithm at ISAAC 2010 in Korea, and experiments showing its practicality at SEA 2011 in Crete; our paper was invited to a special issue of the best papers from SEA.

Additionally, with Löffler, Strash, Mike Goodrich, and Lowell Trott, we studied algorithmic explanations for the success of Milgram's small world experiment. The "small world phenomenon" states that, in large social networks, most or all pairs of people are connected by short paths. However, Milgram showed that, more than this, the paths can be found efficiently, by greedy routing schemes in which messages are routed towards the contact who shares the most common characteristics with the eventual destination. In order to analyze and explain the success of greedy routing, we define the "membership dimension", a measure of the cognitive load imposed on participants in these routing experiments, to be the maximum number of characteristics or categories held by any single individual. We show that this number is very closely related to the small world phenomenon: a social network has short paths between all pairs of vertices if, and only if, it has a category system that supports greedy routing with low membership dimension. This paper was presented at the Workshop on Graph Algorithms and Applications in Switzerland in 2011 and has been invited to a special issue of Theoretical Computer Science.

Katherine Faust

My research focuses on comparing network patterns across different forms of social relations and animal species; developing methodology for social networks, including modeling constraints that graph features place on local network properties; and understanding the association between social networks and demographic processes. My paper "Animal Social Networks" describes basic forms of social organization that hold across animal species and outlines general principles that underpin social networks, regardless of species. The paper "Social and Spatial Networks" examines the association between extended kinship and residential proximity and the paper "Migrant Remittances" looks at the effects of lifecourse changes on remittances and assistance within families; both use data from Nang Rong, Thailand.

Andrew Noymer

I work on the area where two complex systems interface: Epidemiology. While work on the spread of diseases is now a well-elaborated sub-field of mathematical biology, the complex social system also affects who gets diseases, when, and with what severity. As a sociologist/demographer, I work mostly on social and historical epidemiology, though some of my work straddles this area and methodological and modeling concerns. I continue to do much work on influenza pandemics, the subject of my PhD dissertation (2006). The impact of pandemics is socially-mediated: in 1918, my work shows that the *subsequent* epidemiology of tuberculosis was affected by the pandemic. This points to a disproportionate impact on the tuberculous (disproportionately, then as now, a poor group) by the influenza pandemic. My work covers other aspects of social and technical epidemiology. In early 2011, with collaborators at UCI and the U of Oregon, I published an article in *PloS One* showing that racial classification on death certificates is influenced by the circumstances of the death. Among other ongoing projects, I am beginning a series of technical papers on influenza epidemiology, the first of which will be submitted very soon as of this writing (July 2011).

(d) Social Dynamics and Evolution

Jeff Barrett

Most of this year I have been working on a volume for Princeton University Press that contains Hugh Everett's papers and correspondence that led to the many-worlds interpretation of quantum mechanics. Byrne, Weatherall, and I also completed an online archive of over 200 scanned Everett documents that will be published as a part of the UCI Space@the Libraries archive. This work was done under an ongoing NSF grant.

Simon Levin

My research program continues to be devoted to understanding the dynamics of biological diversity at all levels, from the molecular diversity of diseases to the diversity of global ecological and cultural systems. It is furthermore concerned with exploring the importance of that diversity for humans, and socioeconomic mechanisms for sustaining or modifying diversity. To this end, my research can be divided into two main areas: (1) The dynamics of biodiversity and biocomplexity, including infectious diseases and (2) The interactions between ecological systems and socioeconomic systems, with attention

to the management of natural resources. In all of this work, a central thread has been the development of rules for scaling from the microscopic to the macroscopic, from individuals to collectives, from small scales to large, from short time scales to long. I have also been committed to building interfaces between theoretical investigations and their application to the management of natural resources, and to use those applications to stimulate theoretical investigations and the elucidation of general principles for reserve design and the management of ecological systems. New publications are described below; those discussed last year are in general not discussed again, with minor exceptions.

As in the past, my research program has had four main thrusts:
(1) Fundamental laws of biology
(2) The dynamics of biodiversity and biocomplexity
(3) The dynamics of infectious diseases
(4) The interface between ecological systems and socioeconomic systems.
And as I have written before, in all of these, a central thread is the development of rules for scaling from the microscopic to the macroscopic, from individuals to collectives, from small scales to large, from short time scales to long. I am also committed to building interfaces between theoretical investigations and their applications to the management of natural resources, and to use applications to stimulate theoretical investigations.

Kent Johnson

A distinctive aspect of mainstream contemporary theoretical linguistics is its near total reliance on informal, largely implicit "expert judgments" in the assessment of how the available evidence bears on some aspect of a given theory. This contrasts dramatically with other areas of the behavioral sciences, which rely heavily on explicit mathematical (e.g., statistical) methods. I motivate the search for more explicit methods in linguistics by considering the very basic task of estimating the size of a linguistic data set. Such estimations are nontrivial because redundancies in the data can easily lead to overinflated estimates. I offer some explicit operationalizations of the data and their features. Crucially, for linguistic data, negative associations (e.g., correlations) do not indicate true redundancy; however for many measures of association, they can be impossible to ignore. It is proven that this troublesome phenomenon has positive Lebesgue measure, and is monotonically increasing with the prima facie size of the data set, and that these two features hold robustly in four different ways.

Brian Skyrms

A very simple form of trial and error learning learns to signal in a very wide variety of contexts. It succeeds in contexts where various forms of reinforcement learning can fail.

Douglas White

Social Networks &Dynamics members Douglas R. White and Duran Bell collaborated to submit NSF proposals in August 2010 and January 2011 for development of methods of inferential statistics that would solve the confounding problems of non-independence of cases in the observational datasets of anthropology and sociology and develop modeling tools for multivariate models that could, in the best case, support causal inference using the techniques of causal graphs to control for additional biases and confounds (e.g., effects of common causes on causal estimates).

Many of the Social Networks &Dynamics-sponsored seminar series (Human Complex Systems; Networks and Complexity) were invited to help Social Networks &Dynamics faculty and graduate students (Tolga Oztan,

Giorgio Gosti) and other students in MBS and Sociology (via the fall 289B Network Theory and Social Complexity seminar) understand new modeling techniques for the human sciences.

E. Research Seminars and Activities

The research activities of the Institute members often result in graduate research seminars. Among those this year were:

- Networks and Organizations [Butts]
- Informant Accuracy: Methods and Findings [Butts]
- Computational Vision [D'Zmura]
- Weekly seminar of the Center for Algorithms and Theory of Computation [Eppstein]
- Topics in Evolution [Frank]
- Democracy Colloquium [Grofman]
- Intro: Statistics I [Grofman]
- Intro: Statistics II [Grofman]
- Face Perception, Mind-Body Problem [Hoffman]
- Philosophy of Economics [Huttegger]
- Foundations of Measurement {Johnson}
- Experiential Learning Field Study [Keller]
- Decision Analysis [Keller]
- Mathematics of color categorization [Komarova]
- Philosophy of Logic [Maddy]
- Public Choice II [McGann]
- Computational Models of Language Learning [Pearl]
- Language Acquisition [Pearl]
- Political Economy [Saari]
- Social Dynamics [Saari, Skyrms and Narens]
- Methods and Models [Saari, Narens].
- Colloquium in Transportation Science [Small]
- Transportation Economics [Small]
- Political Participation II [Uhlaner]
- Network Theory and Social Complexity [White].
- Networks and Complexity: Human Complex Systems Colloquia [White]

INTER-DISCIPLINARY READING GROUP SPANNING UC SCHOOLS (UCI & UCLA): COMPUTATIONAL MODELS OF LANGUAGE

Assistant Professor of Cognitive Science, Lisa Pearl, continues her discussion group on computational models of language spanning multiple UC Schools. The group meets every two weeks to discuss topics concerning computational models of language, including mathematical models of language acquisition by humans and models of information extraction from language by humans. Information can be found at: http://www.socsci.uci.edu/~lpearl/colareadinggroup/

COLOR AND COGNITION READING GROUP

As described in previous annual reports, Project Scientist, Kimberly Jameson continues to conduct the highly interdisciplinary IMBS Cognition and Color Critical Science Reading Group that focuses on the presentation and discussion of cutting-edge research in the area of, and areas directly related to, the NSF funded research. The seminar consists of a regular contingent of attendees comprised of Institute for Mathematical Behavioral Sciences Faculty, Emeritus Social Sciences Faculty, Cognitive Sciences Faculty; Logic and Philosophy of Science Faculty; Faculty from the Philosophy Department at Cal State University Long Beach; and several UC Irvine graduate student attendees. This reading group has thus far been the source of numerous research presentations relevant to the research project, and has generally contributed to a broader understanding of modeling and empirical challenges relevant to the area. The group meetings have also fostered the general dissemination of research in the area, and have served as a regular educational resource for this research topic that is not otherwise locally available. The group's websites containing content used during the funding period are available online.

New seminar schedules for the 2010-2011 funding period are found at:
http://aris.ss.uci.edu/~kjameson/ColorCogFALL2010.html
http://aris.ss.uci.edu/~kjameson/ColorCogWINTER2011.html
http://aris.ss.uci.edu/~kjameson/ColorCogSPRING2011.html

EVOLUTIONARY DYNAMICS OF SHARED CONCEPTS, KNOWLEDGE AND VALUES--THEME:
UNDERSTANDING COMPLEXITY IN NATURAL, BUILT, AND SOCIAL SYSTEMS

New investigations of evolutionary dynamics underlying foundational issues in cognitive psychology, and social and political theory are proposed (Narens, Skyrms,Saari). They address issues apparently intractable using conventional methodologies. Established mathematical tools are used in innovative ways to understand how fundamental social and psychological concepts and values arise and change, and how dynamic computational frameworks are possible; rather than assuming standard static analyses are appropriate. The approach consists of a combination of network analysis, dynamical systems theory, stochastic processes and the theory of strategic interaction. It's implementation requires a new way of computational thinking for the analysis and evolution of psychological and social concepts and values.

In their computational modeling, interactions between people drive the evolution of categories, concepts and values, and are crucial to knowledge development. Interactions are rarely based on random encounters, and are most likely to occur in social networks. Network structure can influence how concepts and values evolve. Communication needs affects the evolution of concepts. The need to work together affects the evolution of values. Networks mediate the dissemination of information and development of shared knowledge. Knowledge from networks feed back into the evolution of values and concepts. The relevant networks are not static, rather, they themselves evolve. A rich co-evolution of network structure, and shared concepts, knowledge and values exists. Several types of dynamics can be involved in such co-evolutionary processes.

Their computational modeling is very different from the current social science models and theories about issues involving shared concepts, knowledge, and values. Current social science research on such issues is narrowly focused and fragmented across sub-disciplines. Their approach integrates ideas and phenomena from many social science sub-disciplines, e.g., perceptual and cognitive categorization experiments and theory from psychology, network theory from sociology, social norm theory from

sociology and political science, shared knowledge and linguistic data from cultural anthropology, and coordinated behavior theory from economic game theory. Current social science modeling relies on modeling static situations and statistical modeling methods on the data collected from such situations. They focus on dynamic situations, with the "static" ones being viewed as end products of dynamic evolutionary processes—that is, as evolutionary stable states. Their methods use computational and stochastic methods for describing such end products. These differences make their approach revolutionary for the targeted social science objectives. A major goal is establishing new ways of conducting and combining cognitive, social, and political science research.

Education: A main focus here is to develop a publicly available java resource for research and educational purposes. Their experience suggests many researchers and graduate students who encounter these novel dynamic, evolutionary, computational modeling, methods want to use it in their own research, but do not because of steep investments needed to develop their own software. The proposed research plans to make their specific evolutionary simulation programs and analysis techniques available on the internet, and will include research and educational programs developed by researchers outside their group, including programs developed for courses on social evolutionary dynamics. All these resources will uniformly follow series of java modules. They also plan to give at Carnegie Mellon and UC Irvine undergraduate and graduate courses that employ these programs, as well as teach the necessary Java programing needed to utilize them

SOCIAL NETWORKS RESEARCH GROUP

The objective of the UCI Social Network Research Group is to:

- provide an informal setting for discussion of current and ongoing network-related research at UCI (and elsewhere);

- facilitate the exchange of information regarding new techniques, tools, data sources, and research findings;

- support graduate student training in the network field; and

- encourage collaboration among faculty and students on network-related topics.

The Social Network Research Group (SNRG) meets weekly during the academic year, and serves as an open forum for research presentations, meetings with visiting researchers, and discussion of current research. The group consists of a mix of faculty, students, and non-student researchers from the UCI community, as well as outside visitors, and is open to all interested parties. Past agendas and related information can be found at http://erzuli.ss.uci.edu/network.

In addition to open discussions, the following research presentations were given this year:

FALL 2010

October 5
　　Bernoulli Bounds for ERGs, Carter Butts
October 12
　　Issues with Two-Mode Network Data, Lorien Jasny

October 26

Sunbelt Abstract Day - Bring your draft Sunbelt abstract to share with the group!

November 2

Cooperation Dynamics Cued by Structural Properties of Nodes in Networks, Yen-Sheng Chiang

November 9

Semantic Network Structure: Differences Between Late and Typical Talkers, Nicole Beckage

November 23

Panel on Selection and Influence, John Hipp and Lorien Jasny

December 7

Tidbits and Software Demos, Zack Almquist

WINTER 2011

January 10

Open Discussion

January 17

MLK Day - No meeting. (But do come to the IMBS Conference on Behavior in and on Networks, January 21-January 23!)

January 24

Couple-level Heterogeneity as a Bound on Group-level Inequality [Carter Butts and Joy Pixley]

January 31

Cross-Cultural Life History Comparison with Interval Graphs [Sean Fitzhugh]

February 7

Sunbelt. No meeting -- see you in St. Pete's!

February 14

Informal Online Communication in the Deep Horizon Spill [Emma Spiro]

February 21

President's Day - No Meeting

February 28

Networks among Incarcerated Youth [Shannon Reid]

March 7

Perception of Inequality within Networks [Yen-Sheng Chiang]

March 14

Comparative Entailment Analysis of Political Culture [Lorien Jasny]

SPRING 2011

March 31

Open Discussion

April 7

Bayesian Meta-analysis of Network Data [Carter Butts]

April 14

Navigation in Semantic Networks [Nicole Beckage]

April 21

Open Discussion

April 28
  Latent Variable Models for Social Networks I: An Overview of Current Methods [Chris DuBois]
May 5
  Latent Variable Models for Social Networks II: Historical Precedents [Lorien Jasny, Emma Spiro, and Sean Fitzhugh]
May 12
  Latent Variable Models for Social Networks III: More Historical Precedents [Lorien Jasny, Emma Spiro, and Sean Fitzhugh]
May 19
  Latent Variable Models for Social Networks IV: Desiderata and Stylized Facts [Group]
May 26
  Visit w/Dan McFarland (Also see his talk at 4:00 in SSPA 2112!)
June 2
  Inhomogeneous Spatial Mixing in Facebook [Emma Spiro, Zack Almquist, and Carter Butts]
June 9
  Open Discussion

SOCIAL DYNAMICS AND COMPLEXITY RESEARCH GROUP

The focused research group in Social Dynamics and Complexity, headed by Professor Douglas White, has a mediawiki InterSciWiki web site for complexity, dynamics, and network sciences, 16 core members and 13 affiliates. It has a 6 year-long track record in biweekly videoconferences across the four UC campuses, and on-demand streaming replays of speakers in complexity social sciences and student/faculty discussions. The "idea is to have interdisciplinary and intercampus graduate seminars" carried out without the need of any formal institutional funding or administration. Each subgroup in this loose teaching/research network has their own graduate students, and undergraduates participate as well. The peer-reviewed e-journal of anthropological and related sciences, Structure and Dynamics, continues, and has now published 49 open access articles, widely cited (1,850 Google:hits, 167 Google Scholar listed articles, and 4000+ downloads), with 5 articles forthcoming in the next two issues. The group was the subject of a featured article by UCOP and the President's Office of Berkeley electronic Press, and is featured in the AA Newsletter. The newly created UC eRepository version of World Cultures: eJournal of Cross-Cultural Research has only begun to publish its first three issues with 13 articles but already has 1,450 Google:hits, 50 Google Scholar listed articles, 1000+ downloads, and will publish 15 legacy issues while it moves forward with new issues. The group has initiated EduMod sites on its InterSciWiki for open access instruction in a variety of research methodologies, from structural cohesion in social networks to causal analysis with Peer effects. It is in as second round of NSF grant submittals for intermeshed projects titled Networks and
Multilevel Anthropology (D. White PI, D. Bell Co-PI) and A New Dynamic Productive-Wealth Code for the Standard Cross-Cultural Sample (D. Bell PI, D. White Co-PI). White has taken MBS graduate students for research projects the Santa Fe Institute three times in past years and will do so again this summer.

F. Recruitment

This year the IMBS search committee (consisting of Donald Saari (Chair), Andrew Noymer, Anthony McGann, Lisa Pearl, Louis Narens, and Brian Skyrms), identified and recruited Nathan Collins from the Santa Fe Institute to UCI. Nathan is a political scientist with highly eclectic interests and a strong mathematical background. His job talk, "Categorization and the Psychology of Political Behavior", for example, brought together several political science models into a mathematical model that, in part, borrowed concepts from the cognitive sciences.

III. GRADUATE TRAINING

A. Ph.D. and M.A. Students

Louis Narens is the Director of the MBS graduate program. Others on the graduate committee who assist Professor Narens are Professors Marek Kaminski and Michael McBride. Working with the faculty of the Institute are 83 Ph.D. students, of whom 21 have advanced to candidacy during the year. They are listed in Appendix F. Of these, the following students were enrolled in the Ph.D. program in Mathematical Behavioral Sciences during the current academic year:

Kalin Agrawal
Matthew Feldman
Robert Forbes
Giorgio Gosti
Dan Jessie
Tom McIntee
Ray Mendoza
Tolga Oztan
Heidi Tucholski
Sam Thorpe

.   During the year, the Institute continued a program of recruiting graduate students via a mass e-mail describing our program to the Chairs and key faculty of the major colleges and universities in the country.

Insofar as the Institute's budget allows, students in MBS as well as other students whose research relates to MBS are awarded summer stipends. Due to budget cuts, this year the IMBS awarded funds to its graduate students only. We hope to continue the tradition of awarding funds to other mbs-related students in the future.

B. Graduate Activities

This past year the IMBS graduate students organized student meetings with colloquia speakers. This gave students an opportunity to interact and network with professors. One of the goals is to gain some insight into how students perceive IMBS and how to facilitate more involvement of the social science student body.

Three students are going to SFI this summer: Tolga Oztan, and Giorgio Gosti from IMBS and Elliott Wagner from LPS (who is affiliated with IMBS).

The students also cooperated with other graduate students in putting on the 9th Annual Graduate Student Conference. The graduate organizers were Jonathan Cook, Ryan Kendall, and Heidi Tucholski. Following is the conference agenda:

The 9th Annual IMBS Graduate Student Conference

Session I: Understanding Incentives

Session Chair: Ryan Kendall

9:00 Heidi Tucholski, IMBS, Can Government Officials Compromise? Using Mechanism Design to Influence Incentives

9:30 Bennett Holman, Logic and Philosophy of Science, Evaluating Evidential Hierarchies in Evidence Based Medicine

10:00 Jonathan Cook, Economics, Discontinued Goods and the Exchange Rate

10:30 Ten Minute Break

Session II: Modeling Business Decisions

Session Chair: Heidi Tucholski

10:40 David Hewitt, Economics, A Model of Innovation and Licensing

11:10 James Cao, Merage School of Business, Impact of an \Online-to-Store" Channel on Demand Allocation, Online Pricing and Probability

11:40 Joseph Vithayathil, Merage School of Business, Corporate Takeovers: Owner-Governance vs. Entrenched Boards

12:10 Ten Minute Break

Session III: Networks and Interaction

Session Chair: Ryan Kendall,

12:20 Zack Almquist, Sociology, Logistic Network Regression for Scalable Analysis of Networks with Joint Edge/Vertex Dynamics

12:50 Mikaela Fudolig, Physics, Scarcity and Fairness in the Dictator Game

1:20 Giorgio Gosti, IMBS, More Realistic Naming Games

1:50 Ten Minute Break

Session IV: Problems in Aggregation

Session Chair: Jonathan Cook,

2:00 Kalin Agrawal, IMBS, Cultural Consensus Theory: Estimating Consensus in Balanced Signed Graphs

2:30 Ray Mendoza, IMBS, Extracting Semantic Information from Large Corpora of Text

2:55 Tomas McIntee, IMBS, Runo Systems and Their [in]Sensitivity to Perturbation

3:25 Dan Jessie, IMBS, Symmetries in Social Sciences

3:50 Ten Minute Break

Session V: Individual Decisions and Welfare

Session Chair: Zack Almquist

4:00 Galina Belokurova, Political Science, Why are Businessmen Murdered? The Role of the State in Violence Against Business Elites

4:30 Erick Peterson, Economic, Waves as a Common-Pool Resource: Why Do Surfers Share Waves?

5:00 Ryan Kendall, Economics, Are Irrational Businessmen Good for Society?

C. Undergraduate Training

The firm of Sanli Pastore & Hill, located in Los Angeles, has given a gift to the IMBS to support undergraduate students in Economics. The company is a business valuation, financial analysis and litigation consulting firm. The gift is for five years and includes a summer internship for an undergraduate student. The internship is for eight weeks and this year's intern will be Chloe Hazan an undergraduate student in Economics. Last year's intern was economics undergraduate student Vykunth Ashok.

Each year, the IMBS gives the "Jean-Claude Falmagne dissertation award" to a graduate student for the best dissertation that uses mathematics to develop conceptual advances for issues coming from the social and behavioral sciences. Going beyond the use of mathematics for computational purposes, the intent is to award a dissertation that uses concepts from mathematics to reach new conclusions. The prize is $1,000.   Last year the award was given to Political Science graduate student Reuben Kline for his dissertation *,"Essays in Political Economy"*. This year the award went to Economics graduate student George Ng for his dissertation, "*Essays in Behavior, Theory, and Experiments*."

IV. COMMUNICATION

A. Conferences

The IMBS held a conference on "Behavior In and On Networks", and the agenda follows.

IMBS CONFERENCE -- "BEHAVIOR IN AND ON NETWORKS"

Friday, January 21

1:30 – 1:40	Opening Remarks by DONALD SAARI, Director of IMBS
1:40 – 2:30	MATTHEW O. JACKSON, Economics, Stanford – "Network patterns of favor exchange"
2:30 – 2:40	DISCUSSION
2:40 – 3:30	MARK HANDCOCK, Statistics, UCLA – "Modeling networks when data is missing or sampled"
3:30 – 3:40	DISCUSSION
3:40 – 3:50	BREAK
3:50 – 4:40	JURE LESKOVEC, Computer Sciences, Stanford – "The Role of Positive and Negative Links in Online Social Networks"
4:40 – 5:00	DISCUSSION

Saturday, January 22

9:00 – 9:50	MARKUS MOBIUS, Economics, Iowa State – "Experiments on Trust and Risk-Sharing in Social Networks"
9:50 – 10:00	DISCUSSION
10:00 – 10:50	CARTER BUTTS, Sociology, UCI – "A Formal Method for Bounding the Behavior of General Network Models"
10:50 – 11:00	DISCUSSION
11:00 – 11:15	BREAK
11:15 – 12:05	LORI BEAMAN, Economics, Northwestern – "Who gets the job referral? Evidence from a social networks experiment"

12:05 – 12:15   DISCUSSION

12:15 – 1:45   LUNCH BREAK

1:45 – 2:35   ATHINA MARKOPOULOU, Engineering, UCI – "Measurement of Online Social Networks"

2:35 – 2:45   DISCUSSION

2:45 – 3:35   EMMA SPIRO, Sociology, UCI – "Extended Structures of Mediation", and
                CHRISTOPHER DUBOIS, Sociology, UCI – *"Bayesian Laten Set Models for Co-appearance Data"*

3:35 – 3:45   DISCUSSION

3:45 – 4:00   BREAK

4:00 – 4:50   WILLEMIEN KETS, IMBS, UCI – "Inequality and Network Structure"

Sunday, January 23 --   9:00-12:00 -- GENERAL DISCUSSION

B. Conferences/Seminars organized by IMBS Members

Carter Butts

Organizer, Session on Network Methodology at the Third International ARS Workshop on Social Network Analysis - Collaboration Networks and Knowledge Diffusion: Theory, Data, and Methods, 6/2011, Naples, Italy.

Organizer and Lecturer, statnet Workshop at the Third International ARS Workshop on Social Network Analysis - Collaboration Networks and Knowledge Diffusion: Theory, Data, and Methods, 6/2011, Naples, Italy.

Organizer and Lecturer, statnet Workshop at the Political Networks Conference, 6/2011, Ann Arbor, MA.

Organizer and Lecturer, statnet Workshop at the International Sunbelt Social Networks Networks Conference, 2/2011, St. Pete's Beach, FL.

Co-organizer, IMBS Conference on "Behavior In and On Networks," Irvine, CA, 2011.

Rui de Figueiredo

Honorary Chair, 5th. IEEE European Conference on Circuits and Systems for Communications (ECCSC   -2010), to be held in Belgrade, Serbia, o
For details see http://eccsc10.etf.rs.

Katherine Faust

ICPSR Workshop, Introduction to Social Network Analysis, University of North Carolina, Chapel Hill, July 201

Michael Lee

Co-organizer and academic program chair, 2010 Annual Meeting of Society for Mathematical Psychology.

Simon Levin

Co-organizer: Research Frontiers in Sustainability Science: Bridging Disciplines and Practices Workshop, AAAS Annual Meeting, Washington, DC, February 19, 2011.

Steering Committee: Security in the Age of Systemic Risk: Strategy, Tactics and Options for Dealing with Femtorisks and Beyond: A Workshop to Define Evolving Challenges and Innovative Approaches, IIASA and NAS U.S. Committee for IIASA, Laxenburg, Austria. June 9-10, 2011.

Steering Committee: Disease in Motion Conference, Princeton University, November 16, 2010.

Steering Committee: Workshop on Mathematical Challenges for Sustainability, DIMACS, Rutgers University, November 15-17, 2010.

Andrew Noymer

I will be organizing a small workshop at IMBS in October 2011, called "Mathematical modeling of infectious diseases: Bridging data and models"

C. Future Conferences

The Institute is planning several conferences next year and topics are currently in discussion. Once conference scheduled in late Octoberr is, "Infectious Diseases". Another planned for later in the year is, "The Evolution of Religion".

D. Visitors

The Institute hosted 3 visitors during the year. Their letters can be found in Appendix H.

Willemien Kets
Omidyar Postdoctoral Fellow
Santa Fe Institute

Simon Levin
Moffett Professor of Biology
Princeton University

Mikaela Fudolig
Fulbright Fellow
University of the Philippines

Next year the Institute will again sponsor the visit of Simon Levin.

E. Colloquia Series

During the academic year the Institute conducts a colloquia series with speakers both from inside as well as outside the Institute. For speakers outside California, we attempt, insofar as possible, to coordinate their visit with other travel to California. Some speakers are brought here jointly with UCLA's Marschak Colloquium where the speaker first talks at UCI on a Thursday and at UCLA on the following day. We distribute a relevant paper, when available, prior to each colloquium. Most papers are also downloadable from the IMBS web site at www.imbs.uci.edu.

Following are the IMBS colloquia.

<u>FALL 2009</u>

October 7
IGOR KOPYLOV
Department of Economics, UCI
"Simple Axioms for Subjective Probability and Exponential Discounting"

October 14
DAVID PORTER
Economic Science Institute, Chapman University
"Bubbles, Crashes and Durability"

October 21
LAWRENCE DeCARLO
Dept. of Human Development, Teachers College, Columbia University
"On Some Applications of Signal Detection Theory in Psychology and Education"

October 28
RICHARD CHECHILE
Department of Psychology, Tufts
"Using hazard and reverse hazard as tools for understanding underlying psychological processes"

November 4
ALI ABBAS, Industrial & Enterprise Systems Engineering, University of Illinois
"Invariance Relations for m-Switch Utility Functions with Multiple Attributes"

November 18
ROBERT POWELL, Department of Political Science, UC Berkeley, "Persistent Fighting and Shifting Power"

December 2
PEYTON YOUNG, Dept. of Economics, University of Oxford, Research Professor in Economics, Johns Hopkins University, "Learning Efficient Nash Equilibria in Distributed Systems"

WINTER 2009

January 6
CHARLES CHUBB, Department of Cognitive Sciences, UCI, "Untangling the dimensions of perceptual sensitivity"

January 13
JEFFREY ROUDER, Dept. of Psychological Sciences, U. of Missouri, "The development of Bayes factor for psychological research"

January 20
KIMBERLY JAMESON, Institute for Mathematical Behavioral Sciences, UCI
"Evolutionary models of color categorization based on realistic observer models and population heterogeneity"

January 27
JUN ZHUANG, Department of Industrial and Systems Engineering, SUNY at Buffalo, "Strategic Interactions in Disaster Preparedness and Relief in the Face of Man-Made and Natural Disasters"

February 3
LOUIS NARENS, Department of Cognitive Sciences, UCI, "Multimode Utility Theory"

February 10
MICHEL REGENWETTER, Department of Psychology, University of Illinois, "Rationality or Irrationality of Preferences?"

February 17
SIMON LEVIN, Department of Ecology and Evolutionary Biology, Princeton, "Prosociality in Theory and Practice"

February 24
GERARDO CHOWELL, Mathematical, Computational & Modeling Sciences Center, Arizona State University, "Mortality and Transmissibility Patterns associated with the 1918 Influenza Pandemic in Three Latin American Settings"

March 3
JEFF SHAMMA, School of Electrical and Computer Engineering, Georgia Institute of Technology, "Stability & Selection in Game Theoretic Learning"

March 30
JUKKA-PEKKA ONNELA, Postdoctoral Research Fellow, Harvard Medical School,
"Harnessing network science to reveal our digital footprint"

April 7
JUN ZHANG, Department of Psychology, U. of Michigan, "Regularized Learning In Reproducing Kernel Banach Spaces"

April 14
WILLEMIEN KETS, Institute of Mathematical Behavioral Sciences, UCI, "Inequality and Network Structure"

April 21
KEVIN ZOLLMAN, Department of Philosophy, Carnegie Mellon, "Bandit Problems, Social Networks, and Bounded Rationality"

April 28
RAGNAR STEINGRIMSSON, Institute for Mathematical Behavioral Sciences, UCI, "Psychophysical Variations on the Theme of Commutativity"

May 5
MARK MACHINA, Department of Economics, UCSD, *Ambiguity Aversion with Three Outcomes or Many States"*

May 12
MICHAEL BIRNBAUM, Department of Psychology, Cal State Fullerton, *A Comparison of Two Stochastic Mixture Models of Choice"*

May 19
CARTER BUTTS
Department of Sociology, UCI, "Some Simple Constraints on Social Structure"

May 26
DAN McFARLAND, Department of Education, Stanford, "We Just Clicked—Conversational Features of Social Bonding in Speed Dates"

A. Appropriations and Expenditures

V. BUDGET

Appropriations:

IMBS 2010-11 Budget allocation	$ 64,438
Permanent Appropriation	$ 21,040
IMBS 2009-10 Carry Forward	$ 5,008
Visitor Allocation	$ 25,500
Total budget for 10-11	**$115,986**

Expenditures:

Salaries (Director, Staff, Visitor)	$52,316
School Administrative Support	$ 7,500
Conference/Colloquia	$ 9,146
Equipment	$ -0-
Supplies & Expenses	$ 8,858
Graduate Student Support	$12,500
Graduate Student Research	$ 6,000
Total Expenditures:	**$96,320**
Carry Forward to 2011-12:	**$19,666**

(2011-12 Encumbrances: $19,000 for 2 IMBS conferences)

B. Extramural Funding Activity

GRANTS AWARDED AND ACTIVE:

IMBS faculty research was supported by 62 research grants totaling $66,685,514 with 11 pending grants totaling $9,570,364. Following is a detailed breakdown of the extramural funding.

William H. Batchelder

Source of Support: NSF
Amount: $240,000
Award Period: 7/06-8/10
Title: Multinomial processing Tree Models: New projects and Implementations, with X. Hu.

Source of Support: AFOSR
Amount: $200,000
Award Period: 7/09-8/11
Title: "Statistical Development and Application of Cultural Consensus Theory Application of Cultural Consensus Theory, with X. Hu.

Source: Army Res. Office
Amount: $355,000
Award Period: 7/10-8/13
Title: Statistical Inference for Cultural Consensus Theory.

Source: Intelligence Advanced Research Projects Activiti) IARPA).
Amount: $1.2M
Award Period: 7/11-8/15
Title: "Aggregative Contingent Estimation System". Multi -University grant (UCI portion). Co-Researcher, Mark Steyvers PI.

David Brownstone

Source: University of California Center for Energy and Environmental Economics
Amount: $16,878
Award Period: 10/10 – 6/11
Title: The Demand for Hybrid Vehicles.

Source: University of California, Berkeley Institute of Transportation Studies,
Amount: $10,000
Award Period: 4/10 – 9/10
Title: Evaluation of California High Speed Rail Demand Projections.

Source: UC Davis (funded by the California State Environmental Protection Agency)
Amount: $21,075
Award Period: 1/09 – 8/10
Title: Potential Design, Implementation and Benefits of a Feebate Program for New Passenger Vehicles in California.

Charles Chubb

Source: NINDS
Award Amount: $1,212,209
Award Period: 1/09 -12/12
Title: Reflective light modulation by cephalopods in shallow nearshore habitats. PI: R. Hanlon, Marine Biological Laboratory, Woods Hole, MA. , Co-PI: C. Chubb.

Source: NINDS
Award Amount: $419,781
Award period: 1/09 -12/12
Title: Preattentive Visual Sensitivity. PI, C. Chubb; Co-PI, G. Sperling.

Source: EPSRC
Award Amount: $541,000
Award period: 2/1 -2/14
Title: Efficiency of Visual Statistics. PI: J Solomon, Co-PI: M.J. Morgan, C. Chubb and K. May.

Michael D'Zmura

Source: Army Research Office
Award Amount: $151,130
Award period: 6/10 – 5/11
Title: Instrumentation for Mobile Brain-Computer Interface Research, PI.

Source: Army Research Office
Award Amount: $4.1million
Award period: 7/08 – 5/13
Title: Silent Spatialized Communication among Dispersed Forces, PI.

David Eppstein

Source: NSF
Award Amount: $400,000
Award Period: 9/08 -5/011
Title: Algorithms for Grants on Surfaces. With M. Goodrich (UCI) and R. Tamassia (Brown).

Source: ONR/MURI
Award Amount: $1,400,000
Award Period: 9/08 -5/11
Title: Social network analysis.

Source: Office of Naval Research: Multidisciplinary University Research Initiative
Award Amount: $529,152
Award Period: 7/10-8/15
Title: Scalable Methods for the Analysis of Network-Based Data, Co-Investigator.

Steve Frank

Source: NIH MIDAS
Award Amount: $200,000
Award Period: 2/06-1/11
Co-PI; Robin Bush, PI.

Source: NSF
 Award Amount: $230,000
Award Period: 2/09-1/11
Title: Theoretical Biology.

Simon Huttegger

Source: NSF
Award Amount: $275,000
Award Period: 7/10 – 6/13
Title: Collaborative Research: Dynamic Perspectives on Costs and Conflict in Signaling Interactions. Co-PIs: Kevin Zollman (Carnegie Mellon) and Carl Bergstrom (U.Washington).

Kimberly Jameson

Source: UC Pacific Rim Program
Award Amount: $46,616
Award Period: 7/11 – 6/13
Title: Faculty initiative grant: Investigating concept formation and the linguistic processing of natural categories across Pacific Rim ethnolinguistic groups.

Robin Keller

Source: USC CREATE Center, (subcontract from Department of Homeland Security fund
Award Amount: $19,982
Award Period: 3/11 – 9/11
Title: "The Effects of Time on Anticipated Consequences of Risks", Keller (PI), Yitong Wang (student investigator).

Source: NSF
Award Amount: $6,270
Award Period: 2010-2011
Title: "Doctoral Dissertation Research in DRMS: Decision Research on Time, Risk, and Ambiguity." Keller (PI), Yitong Wang (Doctoral student Co-PI).

Source: UCI Environment Institute Grant and UCI UWRC
Award Amount: $48,000
Award Period: Winter 2009-present
Title: "Using IT to Compress Perceived Time and Space in How People Think About Global Change: A Step Towards Behavioral Change." Principal Investigators: Bill Tomlinson (Informatics), Brett Sanders (Civil & Environmental Engineering), and Robin Keller (Merage School)

Natalia Komarova

Source: NIH
Award Amount: $299,564
Award period: 7/05-6/11
Title: Mathematical modeling of programmed CT proliferation.

Source: NIH
Award Amount: $1,806,480
Award period: 6/07-7/12
Title: Quantifying the methylation rate in cancer cells: Computational and experimental approaches.

Source: NIH-ROI
Award Amount: $375,000
Award Period: 7/05-3/12
Title: Mathematical models of programmed CTL proliferation. (Role: Investigator. PI, D. Wodarz.)

Source: P-50
Award Amount: $3,067,892
Award Period: 6/07-7/12
Title: Systems biology of morphogenesis and spatial information flow.)Role: Investigator. P.I. Arthur Lander.)

Michael Lee

Source: IARPA
Award Amount: $29,314
Award Period: 2/11-2/13
Title: Aggregate Contingent Estimation (ACE) program (MURI with multiple investigators..

Source: Alzheimer's Assoc.
Award Amount: $80,000
Award Period: 9/08-8/10
Title: Bayesian Methods for the Detection, Diagnosis and Treatment of Alzheimer's (with Rod Shankle).

Simon Levin

Source: U.S. DOC – National Oceanic & Atmospheric Administration
Award Amount: $99,624
Award Period: 07/01/10 – 06/30/11
Title: Cooperative Institute for Climate Change

Source: The Andrew W. Mellon Foundation
Award Amount: $295,000
Award Period: 10/01/08 – 09/30/11
Title: Dynamics of South African Vegetation

Source: National Science Foundation
Award Amount: $497,366
Award Period: 01/01/11 – 12/31/2015
Title: Dimensions: Collaborative Research: Biological Controls on the Ocean C:N:P Ratios

Source: AXA Research Fund
Award Amount: $81,964
Award Period: 04/1/11 – 03/31/12
Title: Flow Modification for Flood Control – A Biodiversity Trade-Off Analysis

Source: The David and Lucile Packard Foundation
Award Amount: $243,940
Award Period: 01/01/06 – 12/15/11
Title: Managing for Resilience: Science to Advance Ecosystem-Based Management in the Sea of Cortés

Source: Consejo Superior de Investigaciones Ceintificas
Award Amount: $18,014
Award Period: 05/01/09 – 04/30/11
Title: Marie Curie Fellowship: MetaWebs – Unifying Ecological and Evolutionary Networks

Source: National Science Foundation
Award Amount: $10,000
Award Period: 08/01/10 – 07/31/12
Title: NSF Postdoctoral Fellowship: Population Re-Distribution and Its Role in Fluctuating Local Bird Abundaces

Source of Support: Defense Advanced Research Projects Agency
Total Award Amount: $15,400,000
Total Award Period: 09/11/09-09/10/11
Title: Predictive Biology: Adaptability, Robustness and the Fundamental Laws of Biology

Source of Support: National Science Foundation
Total Award Amount: $119,277
Total Award Period: 12/01/09 – 11/30/11
Title: Towards a Science of Sustainability

R. Duncan Luce

Source: NSF
Award Amount: $350,000
Award Period: 9/07-8/11
Title: Empirical and Theoretical Studies of Psychophysical Phenomena. (Co-PIs L. Narens and R. Steingrimsson).

Source: Air Force Office of Scientific Research
Award Amount: $373,427
Award Period: 9/10-8/12
Title: Empirical and Theoretical Studies of Psychophysical Phenomena. (Co-PI R. Steingrimsson).

Michael McBride

Source: U.S. Air Force
Award Amount: $7,500,000
Award Period: 7/10-6/15)
Title: Inferring Structure and Forecasting Dynamics on Evolving Networks. with PI Jeff Brantingham (UCLA), Andrea Bertozzi (UCLA), Ronald Breiger (University of Arizona), Yu-han Chang (USC), Paul Cohen (University of Arizona), Aram Galstyan (USC), Kristina Lerman (USC/ISI), Igor Mezic (UCSB), Brinton Milward (University of Arizona), Allon Percus (Claremont Graduate University), Alexander Tartakovsky (USC), George Tita (UC Irvine).

Source: NSF
Award Amount: $5,000
Award Period: 11/10-9/11
Title: Endogenous Formation of Terrorist Networks. With Sherry Forbes (University of Virginia), Dan Kovenock (University of Iowa), Natalia Londono (University of Texas at Dallas), Susanne Martin (University of Texas, Austin), Ami Pedahzur (University of Texas, Austin), Sudipta Sarangi (Louisiana State University),

Andrew Noymer

Source: UC Pacific Rim
Award Amount: $12,000
Award Period: 5/10-4/11
Title: Faculty Research/Planning Grant.

Source: 2011 C-DASA Seed Grant
Award Amount: $3,000
Award Period: 2011
Title: "Cancer mortality patterns in Pacific islander populations: A comparative analysis of American Samoa, Guam, Hawai'i, and Saipan". PI.

Source: NIH
Award Amount: $4,000
Award Period: 2011
Title: This grant subaward is to organize a small workshop at IMBS in Fall, 2011

Lisa Pearl

Source: Navy
Award Amount: $70,000
Award Period: 1/10-1/11
Title: Using Stylistic Topic Models to Detect Deception Through Unusual Linguistic Activity. N10A-T029, Information System for Uncovering Deception in Unstructured Data, with Mark Steyvers and Jeff Baumes.

Source: NSF
Award Amount: $176,713
Award Period: 1/09-1/12
Title: Testing the Universal Grammar Hypothesis. Co-PI with Jon Sprouse.

Donald Saari

Source: NSF
Award Amount: $300,000
Award Period: 9/06-9/11
Title: A Mathematical Foundation for Voting and Decision.

Source: NSF
Award Amount: $300,000
Award Period: 12/10-11/12
Title: Analyzing multi-scale and multi-unit methodologies.

Padhraic Smyth

Source: Office of Naval Research
Award Amount: $3,359,000
Award Period: 6/08- 5/13
Title: Scalable Methods for Analysis of Network-Based Data

Source: NIH 1R01AA018673-01A1
Award Amount: UC Irvine, $953,952
Award Period: 10/10 - 9/15

Title: Automated behavioral coding via text mining and speech signal processingSource of

Support: IARPA
Award Amount: $1,334,537
Award Period: 4/11 - 2/14
Title: Statistical learning algorithms for text and network analysis

Ramesh Srinivasan

Source of Support: NIH
Award Amount: $2.36 million
Award Period: 9/09 – 5/13
Title: Dynamic Neuroimaging with High-resolution SSVEPs, PI.

Source of Support: Army Research Office
Award Amount: $4.1 million
Award Period: 8/09 – 7/13
Title: Silent spatialized communication among dispersed forces, Co-Principal Investigator (PI: D'Zmura M)

Hal Stern

Source: NSF
Award Amount: $626,000.
Award Period: 18/10-7/13
Title: Enhanced EOF Representations and Time-Varying Statistical Models for Climate Patterns (co-PIs: G. Magnusdottir, Y. Yu)

Source: NIH – NCRR
Award Amount: $750,000/yr.
Award Period: 7/10 - 6/15
Title: UC Irvine Institute for Clinical and Translational Science (Head of Biostatistics, Ethics and Research Design Unit; Dan Cooper (PI))

Source: NIH – NCRR
Award Amount: Approx $25 million
Award Period: 10/05 – 9/11
Title: Functional Imaging Research on Schizophrenia Testbed (Co-Chair of Statistics Working Group). S. G. Potkin (PI))

Jack Xin

Source: NSF
Award Amount:$1,950,568
Award Period: 9/09-8/14
Title: PRISM: UCI Interdisciplinary computational and applied mathematics program.

Source: NSF
Award Amount: $472,566
Award Period: 9/09-8/12
Title: ADT: Sparse Blind Separation Algorithms of Spectral Mixtures and Applications.

Hong-kai Zhao

Source: MURI
Award Amount: $600,000
Award period: 5/07-9/12
Title: Model Classes, Approximation, and Metrics for Dynamic Processing of Urban Terrain Data.

Source: NSF
Award Amount: $153,261
Award Period: 7/08-6/11
Title: The Fast Sweeping Method and Its Applications.

PROPOSALS PENDING

David Brownstone

Source: Brookings Institution
Amount: $40,000
Award Period:
Title: Evaluation of CAFÉ Standards.

Michael Lee

Source: AFOSR
Amount Requested: $222,643
Title: Sequential sampling models of adaptive human decision-making.

Simon Levin

Source: Army Research Office
Amount Requested: $360,000
Title: Coordination and Collective Decision-Making

Source: National Science Foundation
Amount Requested: $14,942.00
Title: Dissertation Research: Long-Term Temporal Dynamics of Savanna-Forest Transitions in Sub-Saharan Africa.

Source: National Science Foundation
Amount Requested: $14,740.00
Title: Dissertation Research: The Evolution of Competitive Mechanisms in Microparasitic Infections.

Source: The John Templeton Foundation
Amount Requested: $385,619.50
Title: Emergence in Human Systems: A Multidisciplinary Approach – PARENT.

Source: University of Arizona
Amount Requested: $125,691.02
Title: Emergence of Pro-Social Behaviors in a Coupled System: Transience and Environmental Feedback

Source: University of California, San Diego
Amount Requested: $318,224.27
Title: Environmental Synthesis Center: A Vision for Global Environmental Forecasting and Innovative Environmental Management

Michael McBride

Source: United States Army Research Office
Amount Requested: $7,500,000
Title: Scalable, Stochastic and Spatiotemporal Game Theory for Real-World Human Adversarial Behavior,   With PI Milind Tambe (USC), Andrea Bertozzi (UCLA), P. Jeffrey Brantingham (UCLA), Vincent Conitzer (Duke), Maria DOrsogna (CSUN), Richard John (USC), Rajiv Maheswaran (USC), Yoav Shoham (Stanford), Martin Short (UCLA), Richard Dekmejian (USC)

Padhraic Smyth

Source of Support: Department of Energy
Amount Requested: UC Irvine, $180,000
Title: Decadal prediction and stochastic simulation of hydroclimate over monsoonal Asia

Source of Support: IARPA
Amount Requested: $1,627,721
Title: Statistical text mining algorithm for extraction of trends from scientific literature

VI. APPENDICES

APPENDIX A
CURRENT FACULTY MEMBERS

MEMBERS

Pierre F. Baldi, (Ph.D. Mathematics, California Institute of Technology). Professor, Information and Computer Science, Director of the Institute for Genomics and Bioinformatics. Research areas: Bioinformatics/Computational Biology, Probabilistic Modeling/Machine Learning.

Jeffrey Barrett, (Ph.D. Philosophy, Columbia University). Professor of Philosophy, University of California, Irvine. Research areas: philosophy of science and the theory of knowledge, philosophy of physics.

William H. Batchelder, (Ph.D. Psychology, Stanford University). Professor of Cognitive Sciences, University of California, Irvine. Research areas: Mathematical modeling and measurement methodology in the social and behavioral sciences.

Michael H. Birnbaum, (Ph.D. Psychology, University of California, Los Angeles). Professor of Psychology, California State University, Fullerton. Research areas: Human judgment, decision-making, and utility measurement.

John P. Boyd, (Ph.D. Communication Sciences, University of Michigan). Professor of Anthropology, University of California, Irvine. Research areas: Algebraic models of social relations, quantitative methods, and sociobiology.

Myron L. Braunstein, (Ph.D. Psychology, University of Michigan). Professor of Psychology, University of California, Irvine. Research areas: Visual perception, especially depth and motion perception.

William Branch, (Ph.D. Economics, University of Oregon). Associate Professor of Economics, University of California, Irvine. Research areas: Macroeconomics, economic theory.

David Brownstone, (Ph.D. Econometrics and Applied Microeconomics, University of California, Berkeley). Professor of Economics, University of California, Irvine. Research areas: Computer-intensive analysis of statistical estimation strategies and applied econometrics.

Jan Brueckner, (Ph.D. Stanford University). Professor of Economics, University of California, Irvine. Research areas: Urban economics, public economics, industrial organization, and housing finance.

Michael L. Burton, (Ph.D. Anthropology, Stanford University). Professor of Anthropology, University of California, Irvine. Research areas: Economics anthropology, cognitive anthropology, and cross-cultural research methods.

Carter Butts, (Ph.D. Sociology, Carnegie Mellon University). Associate Professor of Sociology. Research areas: Computational and Mathematical Organization Theory, Games and Economic Behavior.

Yen-Sheng Chiang, (Ph.D. Sociology, University of Washington). Assistant Professor of Sociology. Research areas: Social Networks, Rational Choice Theory (Trust, Norms and Collective Action).

Linda Cohen, (Ph.D. Social Sciences, California Institute of Technology). Professor of Economics, University of California, Irvine. Research areas: Political economy, public choice, and governmental regulation of business.

Charles Chubb, (Ph.D. Experimental Psychology, New York University). Professor of Psychology, University of California, Irvine. Research areas: neural networks, perceptual learning, visual coding, visual short-term memory, and human choice behavior.

Rui De Figueiredo, (Ph.D. Applied Mathematics, Harvard University). Professor of Electrical and Computer Engineering and Mathematics, University of California, Irvine. Research areas: Mathematical foundations of neural networks, contextual feedback models for automated image understanding.

Barbara Dosher, (Ph.D. Experimental Psychology, University of Oregon). Professor of Cognitive Sciences, University of California, Irvine. Research areas: Memory, visual perception, and depth from visual motion.

Michael D'Zmura, (Ph.D. Psychology, University of Rochester). Professor of Cognitive Sciences, University of California, Irvine. Research areas: Visual perception, color, image understanding, and attention.

David Eppstein, (Ph.D. Mathematics, Columbia University). Professor of Computer Science, University of California, Irvine. Research areas: Computational geometry and geometric optimization, Triangulation and mesh generation, Graph drawing and information visualization, Data depth and robust statistics, Analysis of exponential-time algorithms.

Jean-Claude Falmagne, (Ph.D. Psychological Sciences, University of Brussels). Professor of Cognitive Sciences, University of California, Irvine. Research areas: Assessment of knowledge, measurement theory, psychophysics, and mathematical psychology.

Katherine Faust, (Ph.D. Social Science, University of California, Irvine). Professor of Sociology, University of California, Irvine. Research areas: Social Networks, research methods.

Steve Frank, (Ph.D. Biology, University of Michigan). Professor of Ecology and Evolutionary Biology. Research areas: Complex phenotypes; quantitative dynamics of genetical, biochemical, and cellular mechanisms.

Linton C. Freeman, (Ph.D. Sociology, Northwestern University). Research Professor of Social Sciences, University of California, Irvine. Research areas: Cognition of social structure, social networks.

Michelle Garfinkel, (Ph.D. Economics, Brown University). Professor of Economics, University of California, Irvine. Research areas: Strategic aspects of Monetary and Fiscal Policies.

Amihai Glazer, (Ph.D. Economics, Yale University). Professor of Economics, University of California, Irvine. Research areas: Public Choice, especially concerning commitment problems.

Bernard Grofman, (Ph.D. Political Science, University of Chicago). Professor of Political Science and Social Psychology, University of California, Irvine. Research areas: Models of group decision making, models of individual choice, electoral competition.

Donald Hoffman, (Ph.D. Computational Psychology, Massachusetts Institute of Technology). Professor of Cognitive Sciences and Information and Computer Science, University of California, Irvine. Research areas: Formal theories of perception, human and machine vision, recovery of depth from images.

Simon Huttegger, (Ph.D. Philosophy, University of Salzburg), Associate Professor of Logic and Philosophy of Science Science. Research areas; Probability Theory; Philosophy of Probability; Induction, Decision Theory, Social Philosophy, Dynamical Systems.

Geoffrey Iverson, (Ph.D. Theoretical Physics, University of Adelaide, Australia; Ph.D. Experimental Psychology, New York University). Professor of Cognitive Sciences, University of California, Irvine. Research areas: Psychophysics, statistical estimation/testing of ordinal models.

Kent Johnson, (Ph.D. Philosophy, Rutgers University). Associate Professor of Philosophy, University of California, Irvine. Research areas: Philosophy of Linguistics, Philosophy of Psychology, Cognitive Science, Philosophy of Language, foundational issues concerning the scientific and psychological import of contemporary linguistic theory.

Marek Kaminski, (Ph.D. Government and Politics, University of Maryland). Associate Professor of Political Science, University of California, Irvine. Research areas: political consequences of electoral laws, voting models, democratization,

L. Robin Keller, (Ph.D. Management Sciences, University of California, Los Angeles) Professor of Administration and Social Sciences, Graduate School of Management, University of California, Irvine. Research areas: Individual decision-making, risk analysis, decision problem structuring.

Natalia Komarova, (Ph.D. Applied Mathematics, University of Arizona), Professor, Department of Mathematics and Ecology & Evolutionary Biology. Research areas: Mathematical modeling and biology, virus dynamics, cancer modeling.

Igor Kopylov, (Ph.D. University of Rochester), Associate Professor of Economics. Research areas: Microeconomic theory, decision theory, and game theory.

Michael Lee, (Ph.D. Psychology, University of Adelaide), Professor of Cognitive Science, University of California, Irvine. Research areas: Mathematical and computational models of stimulus representation, categorization, memory, decision-making and problem-solving.

Simon A. Levin, (Ph.D. University of Maryland). Professor of Biology, Princeton University. Research areas: Modeling of ecological systems, dynamics of populations and communities, spatial heterogeneity and problem of scale, evolutionary, mathematical and theoretical ecology, evolution of cooperation and maintenance of social norms.

R. Duncan Luce, (Ph.D. Mathematics, Massachusetts Institute of Technology). Distinguished Research Professor of Cognitive Sciences, and Research Professor of Economics, University of California, Irvine. Research areas: Axiomatic theories of measurement, probabilistic choice and response time models, individual decision making.

Mark J. Machina, (Ph.D. Economics, Massachusetts Institute of Technology). Professor of Economics, University of California, San Diego. Research areas: Utility, decision making, risk behavior.

Penelope Maddy, (Ph.D. Philosophy, Princeton). Professor of Logic and Philosophy of Science, University of California, Irvine. Research areas: Philosophy of mathematics, especially the philosophy of set theory.

Michael McBride, (Ph.D. Economics, Yale University). Associate Professor of Economics. Research areas: Microeconomics, game theory, and political economy.

Anthony McGann, (Ph.D. Political Science, Duke University). Associate Professor of Political Science, University of California, Irvine. Research areas: party systems, democratic theory, formal models of political systems, European government.

Louis E. Narens, (Ph.D. Mathematics, University of California, Los Angeles). Professor of Cognitive Sciences, and Psychiatry and Human Behavior, University of California, Irvine. Research areas: Measurement theory, foundations of science, decision theory.

Andrew Noymer, (Ph.D. University of California, Berkeley). Assistant Professor of Sociology, University of California, Irvine. Research areas: Population, Social Networks, Mathematical Models, Demography of Health & Mortality, Historical Demography

Richard Palais, (Ph.D. Harvard University). Adjunct Professor of Mathematics, University of California, Irvine. Research areas: soliton mathematics, compact differentiable transformation groups, nonlinear global analysis, critical point theory, submanifold geometry, integrable systems.

Lisa Pearl, (Ph.D. University of Maryland). Assistant Professor of Cognitive Sciences, University of California, Irvine. Research areas: Language acquisition, language change, natural language processing.

Dale Poirier, (Ph.D. Economics, University of Wisconsin). Professor of Economics, University of California, Irvine. Research areas: econometrics, both theoretical and empirical, specializing in Bayesian econometrics.

David M. Riefer, (Ph.D. Psychology, University of California, Irvine). Professor of Psychology, California State University at San Bernardino. Research areas: Memory, cognitive science, and mathematical psychology.

A. Kimball Romney, (Ph.D. Social Anthropology, Harvard University). Research Professor of Anthropology, University of California, Irvine. Research areas: Cognitive anthropology, cultural consensus, quantitative methods.

Donald G. Saari, (Ph.D. Mathematics, Purdue University). Distinguished Professor of Mathematics and Economics, University of California, Irvine. Research areas: Mathematics and application of dynamical systems to social sciences; decision theory.

Stergios Skaperdas, (Ph.D. Economics, Johns Hopkins University). Professor of Economics, University of California, Irvine. Research areas: Bargaining models, applications of non-cooperative game theory, bilateral exchange.

Brian Skyrms, (Ph.D. Philosophy, University of Pittsburgh). Professor of Philosophy, University of California, Irvine. Research areas: Probability, induction, causation, rational choice.

Kenneth Small, (Ph.D. Economics, University of California, Berkeley). Professor of Economics, University of California, Irvine. Research areas: Urban economics, transportation economics, discrete-choice econometrics, and energy.

Padhraic Smyth, (Ph.D. Electrical Engineering, California Institute of Technology). Professor, Information and Computer Science, University of California, Irvine. Research areas: Statistical pattern recognition, probabilistic learning, information theory, artificial intelligence, image and time-series modeling.

George Sperling, (Ph.D. Psychology, Harvard University). Distinguished Professor of Cognitive Sciences, University of California, Irvine. Research areas: Human information processing, vision and visual perception, computer vision and image processing.

Ramesh Srinivasan, (Ph.D. Biomedical Engineering, Tulane University). Associate Professor of Cognitive Sciences, University of California. Research areas: Perception, development and cortical dynamics.

Hal Stern, (Ph.D. Statistics, Stanford University). Professor of Statistics, Department of Statistics, University of California, Irvine. Research areas: Bayesian methods, model diagnostics, statistical computing, applications to biological and social sciences, sports and statistics.

Mark Steyvers, (Ph.D. Psychology, Indiana University). Professor of Cognitive Sciences, University of California, Irvine. Research areas: Computational models of memory, reasoning and perceptions.

Rein Taagepera, (Ph.D.Physics, University of Delaware). Professor of Political Science, Department of Political Science, University of California, Irvine. Research areas: Quantitatively predictive models, electoral and party systems, Finno-Ugric area studies.

Carole Uhlaner, (Ph.D. Political Science, Harvard University). Associate Professor of Political Science, University of California, Irvine. Research areas: Rational actor models and statistical analyses of political behavior, especially participation and voting; decision theory; comparative politics.

Douglas White, (Ph.D. Anthropology/Social Theory, University of Minnesota). Professor of Anthropology, University of California, Irvine. Research areas: Social theory, complexity, evolutionary theory, organization, networks, long-term field studies and social dynamics, world-system impacts on local communities, ethnosociology, comparative studies, quantitative methods.

Charles (Ted) Wright, (Ph.D. Experimental psychology, University of Michigan). Professor of Cognitive Science, University of California, Irvine. Research areas: Acquisition and cognitive representation of human skills, speed-accuracy trade-offs, models for shape of trajectories.

Jack Xin, (Ph.D. Courant Institute, New York University). Professor of Mathematics. Research areas: Partial Differential Equations (PDE), Asymptotic Analysis, Scientific Computation, and their Applications in Fluid Dynamics, Voice Signal Processing, Biology, Nonlinear Optics and Geoscience.

John I. Yellott, Jr. (Ph.D. Psychology, Stanford University). Professor Emeritus of Cognitive Sciences, University of California, Irvine. Research areas: Vision, probabilistic choice models.

Hongkai Zhao, (Ph.D. Mathematics, University of California, Los Angeles). Professor of Mathematics, University of California, Irvine. Research areas: Applied and computational mathematics with applications in physics, engineering, imaging science and computer vision.

Kimberly Jameson, (Ph.D. Psychology, University of California, Irvine). Associate Project Scientist, University of California, Irvine. Research areas: categorization behaviors; modeling concept formation for perceptual stimuli (e.g., the cognitive organization of color sensations and its relationship to linguistic classifiers); the development and breakdown of these cognitive functions; and optimum performance in tasks involving color codings.

Vladimir A. Lefebvre, (Ph.D. Psychology, Lomonosov Moscow State University). Researcher for Cognitive Sciences, University of California, Irvine. Research areas: Human reflexion, mathematical modeling of human inner world, military psychology.

Jeff Barrett

Barrett, J. A. and P. Byrne. (2011). The Everett Interpretation of Quantum Mechanics: Collected Works and Commentary 1955-1980, Princeton University Press (in production).

Barrett, J. A. (2011). On the Coevolution of Theory and Language and the Nature of Successful Inquiry Forthcoming in the Stanford Workshop on Evolutionary Game Theory volume.

Barrett, J. A. (2011.) Everett's Pure Wave Mechanics and the Notion of Worlds, Forthcoming in *European Journal for Philosophy of Science*.

Barrett, J. A. (2011.) On the Faithful Interpretation of Pure Wave Mechanics, Forthcoming in *British Journal for the Philosophy of Science*.

Barrett, J. A. (2010). A Structural Interpretation of Pure Wave Mechanics, *Humana.Mente Issue 13.*

William Batchelder

Schmittmann, V. D., Dolan, C. V., Raijmakers, M. E., & Batchelder, W. H. (2010). Parameter Identification in Multinomial Processing Tree Models. *Behavior Research Methods , 42*, 836-846.

Batchelder, W.H., Hu, X., and Riefer, D.M. Multinomial Modeling. In H. Pashler (Ed.). The Encyclopedia of the Mind. Sage Publications, 2011.

Gosti, G., & Batchelder, W. H. (2011). Naming on a directed Graph. In J. J. Salemo, J. Y. Shanchieh, D. S. Nau, & S. K. Chai, *Social Computing Behavioral-Cultural Modeling and Prediction LNCS 6589* (pp. 358-365). New York: Springer.

Batchelder, W. H. (2010). Mathematical Psychology. In L. Nadel, *Wiley Interdisciplinary Reviews: Cognitive Science* (pp. 759-765). New York: Wiley.

William Branch

Monetary Policy and Heterogeneous Expectations, (with George W. Evans) *Economic Theory, May 2011*.

Business Cycle Amplification with Heterogeneous Expectations, (with Bruce McGough) *Economic Theory,* May 2011.

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[2] Those members not listed failed to respond to our request for information.

Learning about Risk and Return: A Simple Model of Bubbles and Crashes, (with George W. Evans) *American Economic Journal: Macroeconomics*, forthcoming.

Finite Horizon Learning, (with George W. Evans and Bruce McGough) *Essays in Honor of Seppo Honkapohja*, forthcoming.

Jan Brueckner

Lectures on Urban Economics, MIT Press, forthcoming (2011).

Sprawl and Blight, (with Robert Helsley), (2011). *Journal of Urban Economics* 69, 205-213.

Alliances, Codesharing, Antitrust Immunity and International Airfares: Do Previous Patterns Persist?, (with Darin Lee and Ethan Singer), *Journal of Competition Law and Economics*, forthcoming.

Carter Butts

Butts, Carter T. (2011). Bayesian Meta-Analysis of Social Network Data via Conditional Uniform Graph Quantiles. *Sociological Methodology*, forthcoming.

Butts, Carter T. (2011). Bernoulli Bounds for General Random Graph Models. *Sociological Methodology*, forthcoming.

Butts, Carter T. and Acton, Ryan M. (2011). Spatial Modeling of Social Networks. In Timothy Nyerges, Helen Couclelis, and Robert McMaster (Eds.), *The Sage Handbook of GIS and Society Research*, 222-250. SAGE Publications.

Butts, Carter T.; Acton, Ryan M.; and Marcum, Chris. (2011). Interorganizational Collaboration in the Hurricane Katrina Response. *Journal of Social Structure*, forthcoming.

Butts, Carter T; Acton, Ryan M.; Hipp, John R.; and Nagle, Nicholas N. (2011) Geographical Variability and Network Structure. *Social Networks*, forthcoming.

Foulds, James; Smyth, Padhraic; Asuncion, Arthur; DuBois, Christopher; and Butts, Carter T. (2011). A Dynamic Relational Infinite Feature Model for Longitudinal Social Networks.   *Proceedings of the 14th International Conference on Artificial Intelligence and Statistics*. (AISTATS).

Gjoka, Minas; Butts, Carter T.; Kurant, Maciej; and Markopoulou, Athina. (2011). Multigraph Sampling of Online Social Networks. *IEEE Journal on Selected Areas in Communications* (special issue on *Measurement of Internet Topologies*), forthcoming.

Gjoka, Minas; Kurant, Maciej; Butts, Carter T.; and Markopoulou, Athina. (2011). Practical Recommendations on Sampling OSN Users by Crawling the Social Graph. *IEEE Journal on Selected Areas in Communications* (special issue on *Measurement of Internet Topologies*), forthcoming.

Kurant, Maciej; Gjoka, Minas; Butts, Carter T.; and Markopoulou, Athina. (2011). Walking on a Graph with a Magnifying Glass: Stratified Sampling via Weighted Random Walks. *Proceedings of the 2011 International Conference on Measurement and Modeling of Computer Systems*. (ACM SIGMETRICS).

Gjoka, Minas; Kurant, Maciej; Butts, Carter T.; and Markopoulou, Athina. (2010). Walking in Facebook: A Case Study of Unbiased Sampling of OSNs. *Proceedings of the 29th IEEE Conference on Computer Communications*. (IEEE INFOCOM).

Mendonca, David; Webb, Gary; and Butts, Carter T. (2010). L'Improvisation dans les Interventions d'Urgence : les Relations Entre Cognition, Comportement et Interactions Sociales" (in French; English title Improvisation in Emergency Response: Linking Cognition, Behavior, and Social Interaction," translators Cassia Blondelot and Marc Lenormand). *Traces: Revue de Sciences Humaines*, 18, 69--86.

Charles Chubb

Hanlon, R.T., Chiao C.C., Mäthger, L.M., Buresch, K.C., Barbosa, A., Allen, J.J., Siemann, L. & Chubb, C, Rapid adaptive camouflage in cephalopods. Chapter in Animal Camouflage: Mechanisms and Function, Ed. Martin Stevens, Cambridge University Press. In press.

Wright, C.E., Marino, V.F., Chubb, C. & Rose, K.A., Exploring Attention-Based Explanations for Some Violations of Hicks Law for Aimed Movements. *Attention, Perception & Psychophysics*, In Press.

Iverson, G., Chubb, C. The analytic form of the daylight locus. Chapter in *Vision, Memory, Attention*, Eds. Chubb C, Dosher BA, Lu Z-L, Shiffrin RM, American Psychological Association, Washington DC, In press.

Wright, C.E., Chubb, C., Winkler, A. Stern, H. Equisalience analysis: a new window into the functional architecture of human cognition. Chapter in *Vision, Memory, Attention*, Eds. Chubb C, Dosher BA, Lu Z-L, Shiffrin RM, American Psychological Association, Washington DC, In press.

Rui de Figueiredo

Byung Moo Lee and Rui J. P. de Figueiredo. "An Enhanced Iterative Flipping PTS Technique for PAPR Reduction of OFDM Signals", in the book Mobile and Wireless Communications Physical Layer Development and Implementation, Salma Ait Fares and Fumiyuki Adachi (Ed.), ISBN: 978-953-307-043-8, INTECH, Available from: http://www.intechopen.com/articles/show/title/an-enhanced-iterative-flipping-pts-technique-for-papr-reduction-of-ofdm-signals.

Michael D'Zmura

Deng, S., Srinivasan, R., Lappas, T. & D'Zmura, M. (2010). EEG classification of imagined syllable rhythm using Hilbert spectrum methods. *J. Neural Engineering* **7**, 1-13.

Thorpe, S., D'Zmura, M. & Srinivasan, R. (2011). Lateralization of frequency-specific networks for covert spatial attention to auditory stimuli. *Brain Topography* DOI: 10.1007/s10548-011-0186-x.

Chi, X., Hagedorn, J.B., Schoonover, D. & D'Zmura, M. (2011, in press). EEG-based discrimination of imagined speech phonemes. *ICBEM* Banff.

Horton, C., D'Zmura, M. & Srinivasan, R. (2011, in press). EEG reveals divergent paths for speech envelopes during selective attention. *ICBEM* Banff.

David Eppstein

J. Augustine, D. Eppstein, and K. Wortman. (2010). Approximate weighted farthest neighbors and minimum dilation stars. Proc. 16th Annual International Computing and combinatorics Conference (COCOON 2010), Nha Trang, Vietnam.Lecture Notes in Comp. Sci. 6196, Springer-Verlag, 2010, pp. 90-99.Discrete Mathematics, Algorithms and Applications 2(4): 553-656.

D. Eppstein, M. T. Goodrich, and D. Strash. (2010). Linear-time algorithms for geometric graphs with sublinearly many crossings. SIAM J. Computing 39(8): 3814-3829.

M. Dickerson, D. Eppstein, and K. Wortman. (2010). Dilation, smoothed distance, and minimization diagrams of convex functions. 7th Int. Symp. Voronoi Diagrams in Science and Engineering, Quebec City, Canada, pp. 13-22.

H.-J. Bandelt, V. Chepoi, and D. Eppstein. (2010). Combinatorics and geometry of finite and infinite squaregraphs. SIAM J. Discrete Math. 24(4): 1399-1440.

D. Eppstein. (2010). Growth and decay in life-like cellular automata. Game of Life Cellular Automata (Andrew Adamatzky, ed.), Springer-Verlag, 2010, pp. 71-98.

M. Dickerson, D. Eppstein, and M. T. Goodrich. (2010). Cloning Voronoi diagrams via retroactive data structures. 18th Eur. Symp. Algorithms, Liverpool. 2010. Lecture Notes in Comp. Sci. 6346, 2010, pp. 362-373, Springer-Verlag.

D. Eppstein. (2010). Regular labelings and geometric structures. Invited to 22nd Canadian Conference on Computational Geometry (CCCG 2010). Invited to Proc. 21st International Symposium on Algorithms and Computation (ISAAC 2010), Jeju, Korea, 2010. Lecture Notes in Comp. Sci. 6506, p. 1, Springer-Verlag.

E. Chambers and D. Eppstein. (2010). Flows in one-crossing-minor-free graphs. Proc. 21st International Symposium on Algorithms and Computation (ISAAC 2010), Jeju, Korea, 2010. Lecture Notes in Comp. Sci. 6506, pp. 241-252, Springer-Verlag.

D. Eppstein, M. Löffler, and D. Strash. (2010). Workshop on Exact Algorithms for NP-Hard Problems, Dagstuhl, Germany, 2010. Proc. 21st International Symposium on Algorithms and Computation (ISAAC 2010), Jeju, Korea, 2010. Lecture Notes in Comp. Sci. 6506, pp. 403-414, Springer-Verlag.

E. Chambers, D. Eppstein, M. T. Goodrich, and M. Löffer. (2010). Drawing graphs in the plane with a prescribed outer face and polynomial area. Proc. 18th Int. Symp. Graph Drawing, Konstanz, Germany.

C. Duncan, D. Eppstein, M. T. Goodrich, S. Kobourov, and M. Nöllenburg. (2010). Lombardi drawings of graphs.   Proc. 18th Int. Symp. Graph Drawing, Konstanz, Germany, 2010. Invited talk at 7th Dutch Computational Geometry Day, Eindhoven, the Netherlands.

C. Duncan, D. Eppstein, M. T. Goodrich, S. Kobourov, and M. Nöllenburg. (2010). Drawing trees with perfect angular resolution and polynomial area. Proc. 18th Int. Symp. Graph Drawing, Konstanz, Germany,

D. Eppstein, M. Löffler, E. Mumford, and M. Nöllennburg. (2010). Optimal 3D angular resolution for low-degree graphs. Proc. 18th Int. Symp. Graph Drawing, Konstanz, Germany.

D. Eppstein, M. T. Goodrich, D. Strash, and L. (2010). Trott. Proc. Extended h-index parameterized data structures for computing dynamic subgraph statistics. 4th Int. Conf. on Combinatorial Optimization and Applications (COCOA 2010), Hawaii, 2010. Lecture Notes in Comp. Sci. 6508, pp. 128-141, Springer-Verlag.

D. Eppstein, M. T. Goodrich, and R. Tamassia. Proc. 18th ACM SIGSPATIAL Int. Conf. Advances in Geographic Information Systems (ACM GIS 2010), San Jose, California, pp. 13-22.

D. Eppstein. (2010). Densities of minor-closed graph families. Electronic J. Combinatorics 17(1), Paper R136.

D. Eppstein, and M. T. Goodrich. (2011). Space-efficient straggler identification in round-trip data streams via Newton's identities and invertible Bloom filters. IEEE Trans. Knowledge and Data Engineering 23(2): 297-306.

S. Cabello, D. Eppstein, and S. Klavar.(2011). The Fibonacci dimension of a graph. Electronic J. Combinatorics 18(1), Paper P55.

D. Eppstein and M. Löffler. (2011). Bounds on the complexity of halfspace intersections when the bounded faces have small dimension. Proc. 27th ACM Symp. on Computational Geometry, Paris.

G. Barequet, M. Dickerson, D. Eppstein, D. Hodorkovsky, and K. Vyatkina. (2011). Circle-based two-site Voronoi diagrams. 27th Eur. Worksh. Comp. Geom., Antoniushaus Morschach, Switzerland, 2011, pp. 59-62. 8th Int. Symp. Voronoi Diagrams in Science and Engineering, Qing Dao, China.

D. Eppstein and D. Strash. (2011). Listing all maximal cliques in large sparse real-world graphs. 10th Int. Symp. Experimental Algorithms, Crete.

D. Eppstein, M. T. Goodrich, and M. Löffler. (2011). Tracking moving objects with few handovers. Algorithms and Data Structures Symposium, (WADS).

K. Buchin, D. Eppstein, M. Löffler, M. Nöllenburg, and R. I. Silveira. (2011). Adjacency-preserving spatial treemaps. Algorithms and Data Structures Symposium, (WADS).

D. Eppstein, M. T. Goodrich, F. Uyeda, and G. Varghese. (2011). What's the difference? Efficient set reconciliation without prior context. Proc. ACM SIGCOMM, Toronto, Canada.

Jean-Claude Falmagne

J.-Cl. Falmagne and Jean-Paul Doignon. (2010). Axiomatic derivation of the Doppler Factor and related relativistic laws. *Aequationes Mathematicae*, 80: 85—99.

J.-Cl. Falmagne. Projections and symmetric expansions of a learning space. arXiv:0803.0575v1 [math-CO]. Accepted for publication in a volume honoring George Sperling. Expected publication: year 2012.

J.-Cl. Falmagne and J.-P. Doignon. *Learning Spaces*. Interdisciplinary Applied Mathematics, Springer-Verlag, Berlin Heidelberg, 2011.

Katherine Faust

Katherine Faust 2011. Animal Social Networks. Chapter 11, pages 148 - 166 in *The SAGE Handbook of Social Network Analysis*, John Scott and Peter J. Carrington Eds. Los Angeles: Sage.

Ronald R. Rindfuss, Martin Piotrowski, Barbara Entwisle, Katherine Faust and Jeffery Edmeades. forthcoming "Migrant remittances and the web of family obligations: Ongoing support among spatially extended kin." *Population Studies*

Ashton M. Verdery, Barbara Entwisle, Katherine Faust, Ronald R. Rindfuss. forthcoming. "Social and spatial networks: Kinship distance and dwelling unit proximity in rural Thailand." *Social Networks*

Steve Frank

Frank, S. A. and Crespi, B. J. (2011). Pathology from evolutionary conflict, with a theory of X chromosome versus autosome conflict over sexually antagonistic traits. Proceedings of the National Academy of Sciences USA (in press).

Frank, S. A. and Smith, E. (2011). A simple derivation and classification of common probability distributions based on information symmetry and measurement scale. Journal of Evolutionary Biology 24:469-484.

Frank, S. A. (2011). Measurement scale in maximum entropy models of species abundance. Journal of Evolutionary Biology 24:485-496.

Michelle Garfinkel

Co-edited with Stergios Skaperdas, Oxford Handbook of the Economics of Peace and Conflict, Oxford University Press (forthcoming).

With Stergios Skaperdas, "Economic Perspectives on Peace and Conflict," in M.R. Garfinkel and S.

Skaperdas (eds), Oxford Handbook of the Economics of Peace and Conflict, Oxford University Press (forthcoming).

With Stergios Skaperdas and Constantinos Syropoulos, "Trade in the Shadow of Power," in M.R. Garfinkel and S. Skaperdas (eds), Oxford Handbook of the Economics of Peace and Conflict, Oxford University Press (forthcoming).

M.R. Garfinkel and S. Skaperdas (eds), "Political Institutions and War Initiation: The Democratic Peace Hypothesis Revisited," in Oxford Handbook of the Economics of Peace and Conflict, Oxford University Press, forthcoming.

Bernard Grofman

Sigelman, Lee, Kenneth Newton, Kenneth J. Meier, and Bernard Grofman (Eds.) The Wit and Humor of Political Science. American Political Science Association and European Consortium for Political Research, 2010.

Giannetti, Daniela and Bernard Grofman (Eds.) A Natural Experiment on Electoral Law Reform: Evaluating the Long Run Consequences of 1990s Electoral Reform in Italy and Japan. Springer, 2011.

Dolez, Bernard, Bernard Grofman and Annie Laurent (Eds.) *In Situ* and Laboratory Experiments on Electoral Law Reform: French Presidential Elections. Springer, 2011.

Grofman, Bernard. 2010. Reflections on Prediction. In Sigelman et al. (Eds.), The Wit and Humor of Political Science. American Political Science Association.

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Thorpe, S., D'Zmura, M., Srinivasan, R. (2011). Lateralization of Frequency-Specific Networks for Covert Spatial Attention to Auditory Stimuli. Brain Topogr. Jun 1. [Epub ahead of print].

Nunez, P.L., Srinivasan, R. (2010). Scale and frequency chauvinism in brain dynamics: too much emphasis on gamma band oscillations. Brain Struct Funct. August, 215(2):67-71.

Deng, S., Srinivasan, R., Lappas, T., and D'Zmura, (2010). M. EEG classification of imagine syllable rhythms using Hilbert spectrum methods (2010), *Journal of Neural Engineering*. Available online doi:10.1088/1741-2560/7/4/046006.

Deng, S. and Srinivasan, R. (2010). Semantic and acoustic analysis of speech by functional networks with distinct time scales, *Brain Research,* 1346:132-144.

Srinivasan, R. (2011). Signal Acquisition: EEG and MEG, Wolpaw, J et al., ed. Brain-Computer Interfaces for Communication and Control, Oxford, New York.

Sutoyo, D. and Srinivasan, R. (2009). Nonlinear SSVEP responses that are sensitive to the perceptual binding of visual hemifields during 'eye' and 'percept' rivalry. *Brain Research* 1251:245-255.

Hal Stern

Bain, C.L., DePaz, J., Kramer, J., Magnusdottir, G, Smyth, P. J., Stern, H., and Wang, C.-C. (2011). Detecting the ITCZ in Instantaneous Satellite Data Using Spatial-Temporal Statistical Modeling: ITCZ Climatology in the East Pacific, *Journal of Climate,* Vol. 24, 216-230.

Bain, C.L., Magnusdottir, G., Smyth, P., and Stern, H. (2011). The Diurnal Cycle of the ITCZ in the East Pacific, to appear in *Journal of Geophysical Research.*

Brown, G.G., Mathalon, D.H., Stern, H., Ford, J., Mueller, B., Greve, D.N., McCarthy, G., Voyvodic, J., Glover, G., Diaz, M., Yetter, E., Ozyurt, I.B., Jorgensen, K.W., Wible, C.G., Turner, J.A., Thompson, W.K., Potkin, S.G., FBIRN (2011). Multisite reliability of cognitive BOLD data, *Neuroimage,* Vol. 54, #3, 2163-2175.

Stern, H. S. (2011). Discussion of Statistical Inference: The Big Picture by R. E. Kass, *Statistical Science,* Vol. 26, #1, 17-18.

Rein Taagepera

R. Taagepera (2010). *Logical models in Social Sciences: How to Begin*. Manuscript, 189 pp. Either this text or a slightly shorter 2009 version is available at http://www.psych.ut.ee/stk/Beginners_Logical_Models.pdf

R.Taagepera (2011). Adding Meaning to Regression. *European Political Science*, 10 (1), 73-85.

R. Taagepera (2011). Albert, Martin, and Peter Too: Their Roles in Creating the Estonian and Latvian Nations. *Journal of Baltic Studies,* 44(2), 125-141. An earlier version was presented at the Baltic Studies Conference, 11 to 14 June 2009, Vytautas Magnus University, Kaunas.

R. Taagepera and Matt Qvortrup (2011). Who Gets What, When, How -- Through Which Electoral System? *European Political Science*, forthcoming.

Douglas White

Douglas R. White. (2011). Kinship, Class, and Community. Douglas R. White. Chapter 10: In, John C. Scott and Peter Carrington, Eds., Sage Handbook of Social Networks. http://amzn.to/pJrNbS preprint at Paul L. Lazarsfeld Center, Columbia University. Santa Fe Institute Working Paper 11-04-015.

Klaus Hamburger, Michael Houseman, Douglas R. White. (2011). Kinship Network Analysis. Chapter 35: In, John C. Scott and Peter Carrington, (Eds.), Sage Handbook of Social Networks. http://amzn.to/pJrNbS.

Douglas R. White. (2011). Social Networks, Cognition and Culture. Chapter 18, Pp. 331-354, Blackwell Companion to Handbook of Cognitive Anthropology, Table of Contents. Eds. David Kronenfeld, Giovanni Bennardo, Victor De Munch, and Michael Fischer http://intersci.ss.uci.edu/wiki/pdf/Social_Nets_Cog-May2010_29pp_a.pdf http://intersci.ss.uci.edu/wiki/pw/Soc_Nets_Cog27pp9-19-09.pdf.

Douglas R. White. (2011). The multilevel networks approach to kinship. Chapter 5, special issue: Penser la Parenté: Méthodes, modèles, debates, l'Homme. Issue editors Klaus Hamberger, François Hèran, and Michael Houseman.

Douglas R. White. (2010). Egocentric and Sociocentric Structure in Classificatory Kinship Systems: Four Theorems. Douglas R. White. Mathematical Anthropology and Cultural Theory 3(6) art 6: 1-19.

(When do local and global sided network structure converge so that there is a correspondence with sided kinship terminology?) Special Issue on Dravidian Kinship Analysis.

Douglas R. White. (2010). Comment on Barbosa de Almeida "On the Structure of Dravidian Relationship Systems." *Mathematical Anthropology and Cultural Theory* 3(4) art 4: 1-9. Special Issue on Dravidian Kinship Analysis.

Charles (Ted) Wright

Wright, C. E., Marino, V. F., Chubb, C., and Rose, K. A. (2011). Exploring Attention-Based Explanations for Some Violations of Hick's Law for Aimed Movements. *Attention, Perception & Psychophysics, 73,* 854-871.

Wright, C.E., Chubb, C., Winkler, A., Stern, H. Equisalience Analysis: A New Window into the Functional Architecture of Human Cognition. In Chubb, C., Dosher, B.A., Lu, Z-L, and Shiffrin, R.M.

(Eds.), *Vision, Memory, Attention*. To be published by the American Psychological, in press. Association.

Jack Xin

Asymptotics for turbulent flame speeds of the viscous G-equation enhanced by cellular and shear flows (with Y. Liu, Y. Yu), Arch. Rationa lMech. Analysis, 199(2), pp 527-561 (2011).

Periodic Homogenization of G-equations and Viscosity Effects (with Y. Liu, Y. Yu), Nonlinearity, 23(2010), pp 2351-2367.

Periodic Homogenization of Inviscid G-equation for Incompressible Flows (with Y. Yu), Comm Math Sciences, Vol. 8, No. 4, pp 1067-1078, 2010.

A Convex Model and L1 Minimization for Musical Noise Reduction in Blind Source Separation (with W. Ma, M. Yu, S. Osher), Comm Math Sciences, to appear, 2011.

Under-determined Sparse Blind Source Separation of Nonnegative and Partially Overlapped Data (with Y. Sun), SIAM J. Scientific Computing, 2011, to appear.

Content Adaptive Image Matching by Color-Entropy Segmentation and Inpainting (with Y. Sun), the 14th International Conference on Computer Analysis of Images and Patterns, A. Berciano et al (Eds.), CAIP 2011, LNCS 6855, pp. 471-478, 2011, Springer-Verlag.

Postprocessing and Sparse Blind Source Separation of Positive and Partially Overlapped Data (with Y. Sun, C. Ridge, F. del Rio, A.J. Shaka), Signal Processing 91(8)(2011), pp 1838-1851.

Convexity and Fast Speech Extraction by Split Bregman Method, (with M. Yu, W. Ma, S. Osher), Interspeech 2010, pp 398-401, Sept 26-30, 2010, Chiba, Japan.

Stochastic Approximation and a Nonlocally Weighted Soft-Constrained Recursive Algorithm for Blind Separation of Reverberant Speech Mixtures (with M. Yu), Discrete and Continuous Dynamical Systems, Vol 28, No. 4, pp 1753-1767, 2010.

MBS 10-06
Emergence of a Signaling Network with "Probe and Adjust"
Simon M. Huttegger and Brian Skyrms

MBS 10-07
Bernoulli Graph Bounds for General Random Graphs
Carter T.Butts

MBS 10-08
A New Way to Analyze Paired Comparisons
Donald G. Saari

MBS 11-01
Bisymmetry Properties of Luce's (2004) Global Psychophysical Representation
R. Duncan Luce

MBS 11-02
Theory and Tests of the Conjoint Commutativity Axiom for Additive Conjoint Measurement
Duncan Luce, Ragnar Steingrimsson

MBS 11-03
Logistic Network Regression for Scalable Analysis of Networks with Joint Edge/Vertex Dynamics
Zack W. Almquist, Carter T. Butts

MBS 11-04
Learning to Signal with Two Kinds of Trial and Error
Brian Skyrms

William Batchelder

"Cultural Consensus Theory". Invited paper read to RAND Corporation Centers, Santa Monica, CA, July 2010.

"Cultural Consensus Theory". Invited paper read in Symposium on Wisdom of the Crowd, Annual Meeting of the Society for Mathematical Psychology, Portland, OR, August 2010.

"A string language for Multinomial Processing Tree Models". Batchelder, W.H., Purdy, B., and Hu, Xiangen. Paper read at Annual Meeting of the Society for Mathematical Psychology, Portland, OR, August 2010.

"Rank-Aggregation and consensus in Ballroom Competition". Anders, R. (Presenter), and Batchelder, W.H. Paper read at Annual Meeting of the Society for Mathematical Psychology, Portland, OR August 2010.

"Binarizing Multi-link Multinomial Processing Tree (MMPT) Models". Hu, X. (Presenter), and Batchelder, W.H. Paper read at Annual Meeting of the Society for Mathematical Psychology. Portland, OR August 2010.

"A three parameter Item Response Model of Matching". Zeigenfuse, M. (Presenter), Batchelder, W.H., and Steyvers, M. Paper read at Annual Meeting of the Society for Mathematical Psychology, Portland, OR, August 2010.

"Multinomial Processing Tree Models and Bayesian Networks: Some formal results". Purdy, B. (Presenter), and Batchelder, W.H. Paper read at Annual Meeting of the Society for Mathematical Psychology, Portland, OR, August 2010.

"Statistical Development and Applications of Cultural Consensus Theory". Paper presented at AFOSR Joint Review Cognition and Decision Making Program. Dayton, OH, January 2011.

"Observations about Cultural Consensus Theory". Paper presented at Workshop on Dynamic Models of Cultural Diversity. Arizona State University, Tempe, Az. February, 2011.

"Naming on a directed graph". Poster presented at the Conference on Social Computing, Behavioral-Cultural Modeling, and Prediction. Gosti, G. (presenter), and Batchelder, W.H University of Maryland, College Park, MD, March 2011.

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[3] Those members not listed failed to respond to our request for information.

William Branch

Workshop on Diverse Beliefs, Department of Economics, Stanford University, August 2010.

Conference on Survey Data on Expectations, New York Federal Reserve Bank, November 2010.

Department of Economics, U.C. Irvine, April 2011.

Conference on Computational Economics and Finance, San Francisco, June 2011.

David Brownstone

Testified on the reliability of demand forecasts for the California High Speed Rail system at the California High Speed Rail Authority Board meeting in Los Angeles, July 2010.

Testified on the reliability of demand forecasts for the California High Speed Rail system at the California State Senate Transportation Committee Hearing, September 2010.

"The Demand for High Speed Rail," California Econometrics Conference, Palo Alto, Sept. 2010.

"The Demand for Hybrid Vehicles," University of California Energy and Environment Institute Annual Conference, Berkeley, CA, June 2011.

Jan Brueckner

UC Santa Barbara, May 2011.

Pennsylvania State University, April 2011.

International Industrial Organization Conference, Boston, April 2011.

ZEW, Mnnheim, Germany, March 2011.

University of Mannheim, March 2011.

Toulouse School of Economics, March 2011.

Tranportation Research Forum, Long Beach, March 2011.

UCLA, February 2011.

American Real Estate and Urban Economics Association meetings, Denver, January 2011.

Transportation and Public Utilities Group meetings, Denver, 2011.

Association for Competition Economics meetings, Norwich, UK, November 2010.

World Conference on Transportation Research, Lisbon, July 2010.

Workshop on Urban Economics, University of Barcelona, July 2010.

Michael Burton

"Pacific Islander options for responding to climate change". Presented at the Annual Meetings of the Association for the Social Anthropology of Oceania, in Honolulu, February 2011.

Carter Butts

"Dynamic Logit Models for Emergent Collaboration Networks." Invited Talk, Third International Workshop on Social Network Analysis -- Collaboration Networks and Knowledge Diffusion: Theory, Data, and Methods (ARS 2011). Naples, Italy, June 2011.

"Detecting Structural Biases Across Networks: Bayesian Meta-Analysis of Social Network Data Using Reference Quantiles." Invited Lecture, Computational Social Science Colloquium, University of Massachusetts, Amherst. Amherst, MA, March 2011.

"Modeling Complex Social Interaction Within and Across Settings via Relational Events" Invited Lecture, Workshop on Complex Networks: The Dynamics of Networks, Statistical and Applied Mathematical Sciences Institute. Research Triangle Park, NC, January 2011.

"Social Networks, Coordination, and Resilience During Disasters: Some Basic Lessons." Invited Lecture, UASI Shared Strategies for Homeland Security Workshop. Denver, CO, December 2010.

"Bounding Complex Network Models with Bernoulli Graphs." Invited Lecture, Workshop on Networks Across Disciplines, 2010 Neural Information Processing Systems Conference. Whistler, BC, December 2010.

'Modeling the Dynamics of Emergent Networks: Collaboration and Mass Convergence in the Hurricane Katrina Disaster". Butts, Carter T. and Almquist, Zack W. 4th Annual Political Networks Conference, Ann Arbor, MI, June 2011.

"Contending Parties: a Logistic Choice Analysis of Inter and Intra-group Blog Citation Dynamics in the 2004 US Presidential Election." Almquist, Zack W. and Butts, Carter T. Poster presentation, 4th Annual Political Networks Conference, Ann Arbor, MI, June 2011.

"A Cross-National Comparison of the Effects of Military and Political Participation on Life Histories." Fitzhugh, Sean M.; Butts, Carter T.; and Pixley, Joy E. Poster presentation, 4th Annual Political Networks Conference, Ann Arbor, MI, June 2011.

"Semantic Networks in the Political Blogosphere." Pierski, Nicole M. and Butts, Carter T. 4th Annual Political Networks Conference, Ann Arbor, MI, June 2011.

"Rumoring During Extreme Events: Deepwater Horizon 2010." Pierski, Nicole M. and Butts, Carter T. Poster presentation, 4th Annual Political Networks Conference, Ann Arbor, MI, June 2011.

"Contending Parties: a Logistic Choice Analysis of Inter- and Intra-group Blog Citation Dynamics in the 2004 US Presidential Election." Almquist, Zack W. and Butts, Carter T. 31st Sunbelt Network Conference (INSNA), St. Pete's Beach, FL, February 2011.

"A Technique for Analyzing ERGM Behavior Using Bernoulli Graphs." 31st Sunbelt Network Conference (INSNA), St. Pete's Beach, FL, February 2011.

"Network Approach to Pattern Discovery in Spell Data." Fitzhugh, Sean M.; Butts, Carter T. and Pixley, Joy E). 31st Sunbelt Network Conference (INSNA), St. Pete's Beach, FL, February 2011.

"Homophily and Propinquity in Social Ties, and the Consequences for Neighborhood Cohesion." Hipp, John R., Butts, Carter T., Nagle, Nicholas N., Acton, Ryan M., Boessen, Adam, and Marcum, Christopher. 31st Sunbelt Network Conference (INSNA), St. Pete's Beach, FL, February 2011.

"Link-Trace Sampling for Social Networks: Advances and Applications." Kurant, Maciej, Gjoka, Minas, Butts, Carter T., and Markopoulou, Athina. 31st Sunbelt Network Conference (INSNA), St. Pete's Beach, FL, February 2011.

"Comparative Analysis of Classroom Interactions Using Relational Event Models." Pierski, Nicole M., DuBois, Christopher, Butts, Carter T., and McFarland, Dan. 31st Sunbelt Network Conference (INSNA), St. Pete's Beach, FL, February 2011.

"Rumoring in Informal Online Communication Networks." Spiro, Emma S., Acton Ryan M., Sutton, Jeannette, Greczek, Matt, and Butts, Carter T. 31st Sunbelt Network Conference (INSNA), St. Pete's Beach, FL, February 2011.

Charles Chubb

"Deriving Attention Filters for Weber Contrast from Centroid Estimations", Invited talk presented at the Wellcome Trust, London, in a Conference honoring the research achievements of Michael J. Morgan, August 2010.

"Binding Brightness and Loudness in Dynamic Audiovisual Displays". Poster presented by D. Mann (D. Mann & C. Chubb), at the annual meeting of the Vision Sciences Society, Naples, FL, May 2011.

"Mechanism(s) for Apprehending Numerosity based on several Visual Properties". Poster presented by C.E. Wright (C.E. Wright, C. Chubb, E. Shamshiri, M. Wang), at the annual meeting of the Vision Sciences Society, Sarasota, FL, May 2011.

Rui de Figueiredo

"On Adaptation, Learning, Understanding, Evolution, Discovery, and Invention in a Multimedia Environment", keynote address at the 2010 IEEE Symposium on Multimedia (ISM-2010), San CA, December 2010.

David Eppstein

"Regular labelings and geometric structures", Invited talk at 22nd Canadian Conference on Computational Geometry (CCCG 2010).

"Lombardi drawings of graphs", Invited talk at 7th Dutch Computational Geometry Day, Eindhoven, the Netherlands, 2010.

"Regular labelings and geometric structures", Invited talk at 21st International Symposium on Algorithms and Computation (ISAAC 2010), Jeju, Korea, 2010.

"Flows in one-crossing-minor-free graphs", Contributed talk at 21st International Symposium on Algorithms and Computation (ISAAC 2010), Jeju, Korea, 2010.

"Listing all maximal cliques in sparse graphs in near-optimal time", Workshop on Exact Algorithms for NP-Hard Problems, Dagstuhl, Germany, 2010.

Katherine Faust

"Sociality and Associations: A cross disciplinary look at mode definition in affiliation networks." International Network For Social Network Analysis. Riva del Garda, Italy, July 2011.

"Comparing Local Configurations in Social Networks." International Network For Social Network Analysis. St. Pete Beach, Florida. February 2011.

"Comparing Social Networks." Department of Computer Science, University of California, Davis, March 2011.

"Comparing Social Networks." Department of Sociology, University of North Carolina, Charlotte, March 2011.

"Comparing Social Networks." Keynote Address. 7th UK Conference on Social Networks, Greenwich England, July 2011.

Donald Hoffman

2010 Evolution of Shape Perception. Shape Workshop, European Conference on Computer Vision, Crete, Greece.

"Evolutionary Psychology of Attractiveness". VF Corp.\ Workshop. Beverly-Wilshire, LA, 2010.

"Artificial Neural Networks for ARPDD". Naval Research Labs, Washington, DC, 2011.

"How the mind creates the visual world". UCI CEO Roundtable Retreat. Carmel Valley, CA, 2011.

"Face Perception". Procter & Gamble, Colerain Township, Ohio, 2011.

"Color Vision". Procter & Gamble, Mason, Ohio, 2011.

"Visual Science". Procter & Gamble, Cincinnati, Ohio, 2011 .

"Evolutionary Psychology". Procter & Gamble, Cincinnati, Ohio, 2011.

"Visual Attention". Procter & Gamble, Cincinnati, Ohio, 2011.

Simon Huttegger

"Networks and Information Transfer", Workshop on Networks, Signaling, and Social Epistemology, London School of Economics, July 2010

"Networks, Signaling, and Social Epistemology", Tutorial for the master class of the Choice Group at the London School of Economics, July 2010

"Debating Darwin: Philosophical Issues in Evolution and Natural Selection", Invited discussant at the UC Santa Barbara Conference February 2011

"Low Rationality Learning for Networks", Episteme conference, Pittsburgh CMU, June 2011

Geoffrey Iverson

"Remarks on Quantum Cognition", talk at the annual Meetings of the Society for Mathematical Psychology, Portland OR, August 2010.

Kimberly Jameson

"Evolutionary models of color categorization based on realistic observer models and population heterogeneity." Jameson, K. A. & Komarova, N. L Invited presentation. Optical Society of America: Fall Vision Meeting. Rochester, NY. October, 2010.

"Evolutionary models of color categorization based on realistic observer models and population heterogeneity." Institute for Mathematical Behavioral Sciences colloquium. UC Irvine, January 2011.

"Should we be thinking about the potential for human tetrachromacy?" Invited talk. Institut für Psychologie. Christian-Albrechts-Universität zu Kiel. June 2011.

"Applying internet-based research methods to transform a paper archive of cross-cultural data into a digitally coded open-access research database: Details, ideas and discussion." Invited talk. Host: Ulf - Dietrich Reips. Basque Foundation for Science: Ikerbasque, Deusto University, Bilbao, Spain. July 2011.

"Evolutionary models of color categorization on networks." Tauber, S., Narens, L., & Jameson, K. A. Talk at the annual meeting of the American Society for Mathematical Psychology, Tufts University, Medford, MA, July 2011.

"New results on simulated color categorization behaviors using realistic perceptual models, heterogeneous observers and pragmatic communication constraints." Jameson, K. A., Komarova, N. L., Tauber, S. & Narens, L.   Presentation at *The 17th annual meeting of the Cognitive Science Association for Interdisciplinary Learning*. Hood River Valley, OR, August 2011.

Kent Johnson

"A lot of data", Philosophy of Science Association meeting, Montreal, CA, November 2010.

Marek Kaminski

"Strategic Ailment", Pedagogical Academy, Warsaw, Poland, November 2010.

"Generalized Backward Induction", Institute of Sociology, Warsaw University, Warsaw, Poland, November 2010.

Robin Keller

"Avoiding the Risk of Responsibility by Seeking Uncertainty: Responsibility Aversion and Preference for Indirect Agency When Choosing for Others," James M. Leonhardt (presenter, marketing doctoral student), L. Robin Keller and Cornelia Pechmann, Jan. 12-14, 2011, Bayesian Research Conference, Fullerton.

"How to Make Smart Choices", Irvine Presbyterian Church, Primetimers, May 2011.

"Preferences and Subjective Valuation of Sequences of Lives." Jeffery L. Guyse and L. Robin Keller. Invited presentation in session organized by Keller at INFORMS conference in Austin, TX, November 2010.

Modeling Reference-Dependence Under Uncertainty." Jay Simon and L. Robin Keller. Invited presentation in session organized by Keller at INFORMS conference in Austin, TX, November 2010.

"Exploration and Extension of the Uncertainty Effect: Probabilistic Ambiguity and Comparison Direction. Yitong Wang, L. Robin Keller, Tianjun Feng. Invited presentation in session organized by Keller at INFORMS conference in Austin, TX, November 2010.

"Accountability-aversion and a preference for uncertainty." James Leonhardt and L. Robin Keller (with Connie Pechmann). Invited presentation in session organized by Keller at INFORMS conference in Austin, TX, November 2010.

Natalia Komarova

"Mathematical Modeling of Drug Resistance in Cancer". Invited talk, 7th International Conference on Biological Physics, UCSD, June 2011.

Michael Lee

"Cognitive Models, the Wisdom of Crowds, and Sports Predictions", Annual Meeting of Society for Mathematical Psychology, Portland, July 2010.

"Heuristic Models of Sequential Decision-Making", Annual Meeting of Cognitive Science Society, Portland, July 2010.

"The Accuracy of Small-Group Estimation and the Wisdom of Crowds", Annual Meeting of Cognitive Science Society, Portland, July 2010.

"Individual Differences in Attention During Category Learning", Annual Meeting of Cognitive Science Society, Portland, July 2010.

"Examples of Using Flexible Psychological Models in the Bayesian Analysis of Data", Symposium Presentation, Psychonomics Society Meeting, St. Louis, November 2010.

Two Day Course on "Bayesian Graphical Modeling", University of Zurich, Zurich, December 2010.

"Combining Knowledge Through Competition", Annual Interdisciplinary Conference, Jackson Hole, February 2011.

"Coping with the Information Age", Expert Speaker Series, UCI School of Social Sciences, Irvine, March 2011.

"Using Hierarchical Bayesian Methods to Extend Heuristic Models of Decision-Making", Department of Psychology, University of Basel, February 2011.

"Modeling Recall With Unknown Rehearsal Times", Context and Episodic Memory Symposium, Philadelphia, May 2011.

Simon Levin

"Evolution of Ecosystem Properties," Systems Biology Seminar Series, The Center for Complex Biological Systems and The Mathematical, Computational and Systems Biology Graduate Program, UC Irvine. January 201.1

"Allocation and Public Goods/Common Pool Resources," International Seafood Sustainability Foundation, Allocation Workshop, Theoretical Approaches to Allocation of Common Property Resources, Yountville (Napa Valley), CA, February 2011.

"Prosociality in Theory and Practice," IBMS Colloquium, UC Irvine, February 2011)

"Complex Adaptive Systems and the Challenge of Sustainability," Research Frontiers in Sustainability Science: Bridging Disciplines and Practices Workshop, AAAS Annual Meeting, Washington, DC, February 2011.

"Prosociality in Theory and Practice," Evolutionary Approaches to International Environmental Cooperation Workshop, Tilburg Sustainability Center, Tilburg University, The Netherlands, May 2011.

"Learning to Live in a Global Commons: Socioeconomic Challenges for a Sustainable Environment," World Congress of Environmental and Resource Economists, Montreal Canada June-July 2010.

"Evolutionary Perspectives on Discounting and Sustainability," Theoretical Models in Ecology, Evolution, and Behavior: Recent Advances and Conceptual Issues (Conference in Honor of Prof. Danny Cohen's 80th Birthday), Department of Evolution, Systematics, and Ecology, The Hebrew University of Jerusalem, July 2010.;

"Learning to Live in a Global Commons: Socioeconomic Challenges for a Sustainable Environment," Life Sciences Institute Seminar, The Hebrew University of Jerusalem, July 2010.

"The Challenge of Sustainability: Lessons From an Evolutionary Perspective," Cornell University, Department of Ecology and Evolutionary Biology, September 2010.

"Collective Motion in Animal Populations," Symposium on Systems and Control – A Tribute to Three Masters: Guido Guardabassi, Arturo Locatelli, Sergio Rinaldi, Politecnico di Milano, Milan, Italy, September 22-25, 2010.

Margalef Prize. 1. Margalef Prize Lecture: "Evolution at the Ecosystem Level," 2. Margalef Prize Acceptance Speech: "On the Evolution of Ecosystem Patterns," Barcelona, Spain, October 2010.

"Ecological Perspectives on Risk, Uncertainty, and Opportunity," SFI Business Network Topical Meeting: Uncertainty, Risk and Vulnerability, NY, NY, October 2010.

"Evolution at the Ecosystem Level: On the Evolution of Ecosystem Patterns," LATSIS Symposium on Ecohydrology 2010, Lausanne, Switzerland, October 2010.

"Collective Motion in Animal Populations," and "Evolution of Ecosystem Properties," Advanced School on Complexity, Adaptation, and Emergence in Marine Ecosystems, Trieste, Italy, October 2010.

"The Challenge of Sustainability: Lessons from an Evolutionary Perspective," International Symposium on Sustainability Science, Institute for Sustainability Studies, Montclair State University, Montclair University, NJ, October 2010.

"Learning to live in a Global Commons: Socioeconomic Challenges for a Sustainable Environment," World Bank, Development Economics (DEC), Operations & Strategy, Washington DC, November 2010.

"Learning to live in a Global Commons: Socioeconomic Challenges for a Sustainable Environment," Resources for the Future, Washington DC, November 2010.

"Infectious Disease Control and Social Norms," Disease in Motion Conference, Princeton University, November 2010.

"Evolution of Ecosystem Properties," MIT, Civil and Environmental Engineering, Environmental Fluid Mechanics, Hydrology Seminar Series, December 2010.

Penelope Maddy

"Objectivity in mathematics", Sixth Annual Thomas and Yvonne Williams Lecture for the Advancement of Logic and Philosophy, April 2010.

"Naturalism and common sense", Simon Fraser University, May 2010.

"Naturalism and common sense", Conference on Naturalism and the Nature of Philosophy at University of Cincinnati, October 2010.

"The philosophy of logic, retiring presidential address", ASL North American Annual Meeting, UC Berkeley, March 2011.

Michael McBride

Presenter, Western Economic Association International, Association for the Study of Religion, Economics, and Culture, July 2010.

Presenter, Brigham Young University, Department of Economics, August 2010.

Participant, Building Areas of Expertise: Funding Research on Terrorism Conference, UT Dallas, October 2010.

Presenter, American Economic Association EA Meetings, Denver, January 2011.

Presenter, Japan-Irvine Conference on Public Policy, UCI, February 2011.

Presenter, Franklin & Marshall Colloquium on Distributive Justice in Democracies, Lancaster, PA, April 2011.

Presenter, Association for the Study of Religion, Economics, and Culture, April 2011,

Andrew Noymer

"Gompertz analysis of pneumonia and influenza death rates by age, United States, 1959–2006". Andrew Noymer and Cécile Viboud. Session 122 & Poster 332 (respectively). Population Association of America, 2011 Annual Meeting, Washington, DC & Options for the Control of Influenza VII, Hong Kong, 2010.

"Mortality co-movement at the national level: A quasi-social network analysis", Population Association of America. Andrew Noymer, Tanya Jukkala, Chrstopher S. Marcum. Annual Meeting, Washington, DC, Session 126, 2011.

"A comparative analysis of tuberculosis mortality decline in Thailand and the United States". Andrew Noymer, Amara Soonthorndhada, Patama Vapattanawong. All-UC Group in Economic History & Asia-Pacific Economic and Business History Conference, The Great Divergence: Perspectives from the Pacific Rim, Session 2, Berkeley, 2011.

"Clique analysis of mortality co-movements: A new life expectancy time series analysis". Andrew Noymer, Tanya Jukkala, Chrstopher S. Marcum, [by invitation]. IUSSP Seminar on "Lifespan Extension and the Biology of Changing Cause-of-Death Profiles", Rauischholzhausen, 2011.

"Can seasonality explain clustering of child mortality? A theoretical investigation via simulation". Workshop, Seession 4, [by invitation]. "Death Clustering: Towards new explanations for infant and child mortality in the European past", Umeå, 2010.

"Demographic approaches to the analysis of influenza time series data", US Centers for Disease Control and Prevention & Thai Ministry of Public Health, Nonthaburi, May 2011.

"Pneumonia and influenza death rates: A Gompertz-model approach Centers for Disease Control and Prevention", (OID/NCIRD), Atlanta, October 2010.

Lisa Pearl

"Making Sense of Information Overload", with Michael Lee and Mark Steyvers, Social Sciences Expert Speaker Series, University of California, Irvine, April 2011.   .

"Looking Beyond: What Indirect Evidence Can Tell Us About Universal Grammar", Workshop on Language, Cognition, and Computation & Workshop on Language, Variation, and Change, University of Chicago, March 2011.

"Some Fundamental Issues in Language Acquisition Research and the Contribution of Computational Modeling", guest lecture in Psycholinguistics at the California State University, Fullerton, November 2011.

Dale Poirier

"Partial Observability in Bivariate Probit Models: Revisited", Department of Economics, UCI, January 19, 2011; University of Tokyo, Japan, February 4, 2011; Applied Bayesian Statistics and Econometrics Workshop, Kyoto, Japan, February1, 2011.

"Bayesian Interpretations of Heteroskedastic Consistent Covariance Estimators Using the Informed Bayesian Bootstrap", Tenth World Congress of the Econometric Society, Shanghai, China, August 19, 2010.

Donald Saari

"Dark matter and the Newtonian N-body problem". Invited key lecture at a conference *Hamiltonian Systems 2010*, Mexico City, Mexico, December 2010.

1. Invited lecture: "Mysteries involving paired comparisons"
2. Invited tutorial: "Explaining Voting Paradoxes; including Arrow's and Sen's Theorems"
RAMiCA (Relational Algebraic Methods in Computer Applications), Rotterdam, May 2011

"Mechanism design and international relations," at a conference *International Relations*, IIASA, Vienna June 2011.

"The inherent complexity of economics and the social sciences," Colloquium, Economics, Shanghai University of Finance and Economics, China, September. 2010.

"Complexity in Economics and the Social Sciences is related to complexity & in engineering" Colloquium, Economics, Zhejiang University, Hangzhou, China, September 2010.

"Dark matter; is it really a problem?" Colloquium, Physics, University of Vienna, June 2011.

"Mathematical structure of group decision rules", conference on decision analysis, American Institute of Mathematics, Palo Alto, CA, August 2010.

1. "Unexpected complexities arising in multiscale analyses'" and
2. "Are the fundamentals for multiscale modeling mathematically rigorous?"
at NSF CMMI conference on *Research and Innovation*, Atlanta, January 2011.

"Unexpected complexities with standard resource allocation approaches". *Allocation Workshop; International Seafood Sustainability Foundation*, Napa, February 2011.

"Why can voting outcomes differ from what the voters really wanted?" For the Santa Fe Institute, Santa Fe, NM., September 2010.

"Voting; that is *real* chaos!" Dr. Karen Ames Memorial Lecture , Applied Mathematics, University of Alabama, Huntsville, October 2010.

"How the mathematics of the surface of donuts can answer so many questions!" Math Club, UCI, February 2011.

Brian Skyrms

Northwestern University, Evolution. Language Workshop, September 2010.
.
Ernest Nagel lectures Carnegie-Mellon University, October 2010.

Winer Memorial Lecture, Purdue University, October 2010.

Conference on "Causation, Coherence and Concepts" University of Konstanz, November 2010.

London School of Economics Rational Choice Lecture, November 2010.

Oxford University Lecture of Signaling, November 2010.

University of Edinburgh (2 lectures), November 2010.

Decision Theory Symposium, University of Missouri, Feb ruary 2011

PPE lecture, University of Pennsylvania, February 2011.

Author Meets Critics Session on my book, SIGNALS, American Philosophical Association, April 2011.

Larryfest, University of Michigan, May 2011.

Formal Epistemology Workshop USC "Inventing New Signals", May 2011.

Keynote Address--Third Meeting of the Rationality and Decision Research Network, June 2011.

London School of Economics "From the Dynamics of Rational Deliberation to
Signals", June 2011.

Ken Small

Speaker, "Energy Policies for Transportation," Workshop Toward a New National Energy Policy:
Assessing the Options, Resources for the Future, Washington, D.C., Jun 2010; Danish Technical
University, Sept. 2010; Northwestern University, Sept. 2010

Panelist, Workshop on "Pricing and Social Equity," Keston Institute for Public Finance and
Infrastructure Policy, Univ. of Southern California, April 2010.

 "Gasoline and Carbon Taxes," Conference on Transportation Revenue Options: Infrastructure,
Emissions and Congestion, Harvard Kennedy School, Cambridge, Mass., May 13-14, 2010.

Discussant, "Land Use and Vehicle Miles of Travel in the Climate Change Debate", Conference on
Climate Change, Environment, and Land Use Policies, Lincoln Institute of Land Policy, Cambridge,
Mass., May 24-25, 2010.

Padhraic Smyth

"The Netflix prize and competition", *UC Irvine Cognitive Sciences Department Seminar*, March 7th
2011.

"Modeling normal behavior and detecting anomalous patterns in time-series of human activity", *UCLA
Statistics Seminar Series*, October 2010.

"Modeling social network data over time using hidden variable models", *National University of Ireland
Galway (NUIG), Information Technology Seminar Series*, Galway, Ireland, October 2010.

"Network event data over time: prediction and latent variable modeling", *Mining and Learning with
Graphs (MLG 2010)*, invited talk, Washington DC., July 2010.

Hal Stern

"Statistics at the Summit". Commencement Address at UCLA Department of Statistics, June 2011.

Rein Taagepera

"Institutions and Theory". Paper prepared for Summer School on "Institutions in Context", Tampere, May 31 to June 6, 2010.

Carole Uhlaner

"Political Mobilization and Incorporation: The Case of Vietnamese-Americans in Orange County" coauthored with graduate students Danvy Le and Peter Miller. 104th Annual Meeting of the American Political Science Association, Washington, D.C., September 2010.

Charles (Ted) Wright

"Analysis of Visual Properties in American Sign Language". Bosworth, R. G., Wright, C. E., & Dobkins, K. R. (2010). TISLR (Theoretical Issues in Sign Language Research Conference) 10. Purdue University.

"Cross-Linguistic Associations in the Vocabularies of Bilingual Children: Number Words vs. Color Words and Common Nouns". Sarnecka, B. W., Wright, C. E., & Goldman, M. C. M. Poster presented at the biennial meetings of the Society for Research in Child Development. Montreal, Canada, 2011.

"Transfer of Learning across Response Systems Differs Importantly across Movement Tasks". Invited address at the University of Otago, Dunedin, NZ, March 2011.

"Mechanism(s) for Apprehending Numerosity based on several Visual Properties" . Wright, C.E., Chubb, C., Shamshiri, E. & Wang, M. Poster presented at the annual meeting of the Vision Sciences Society, May 2011.

Jack Xin

International Workshop in Computational Mathematics, Zhejiang University, China, June 2010.

International Conference in Applied Mathematics, City Univ of Hong Kong, China June 2010.

Park City Summer School in Image Processing, Utah. July 2010.

Beijing Summer School, Academia Sinica, China, Aug 2010.

Applied Math Colloquium, Caltech, Jan 2011.

UC Merced Applied Math Colloquium, Merced, CA, April 2011.

Algorithm Workshop on Chemical Detection, Boston, MA, June 2011 .

NJIT International Conference on Wave Propagation, Newark, June 2011.

William Batchelder

2011 Invited Speaker at Workshop on Dynamic Models of Cultural Diversity to commorate the 25th Anniversity of Cultural Consensus Theory. Arizona State University, Tempe, AZ, February 2011.

Rui de Figueiredo

Awarded the 2009 P. L. Kapitsa Prize (Gold Medal) by the Russian Academy of Natural Sciences (RANS) for "pioneering contributions to the mathematical foundations and applications of signal processing".

Awarded the 2010 RANS Golomb/Chilingar Medal of Honor of "Giants in Sciences and Engineering".

Member of the IEEE-USA RDPC (Research & Development Policy Committee). This is a Washington/DC-based IEEE "Think-Tank" that reviews and writes position papers on science and technology documents submitted by the Administration to the US Congress, and interacts with the appropriate members of the Congressional Caucus and/or their staffers regarding policy on legislation and appropriations for R & D in Science, Technology, Engineering, and Mathematics. For example, this Committee was involved in the passage by the Congress of the US bill "COMPETES".

Katherine Faust

Chancellor's Award for Excellence in Undergraduate Research, 2011, for Distinguished Fostering of Undergraduate Research, University of California, Irvine.

Steve Frank

Hogge-Baer Visiting Professor in Cancer Research, University of Chicago, April - September 2011.

Michelle Garfinkel

I serve on the editorial boards of: Journal of Conflict Resolution, Journal of Macroeconomics, Journal of Economics and Business, Defence and Economics, European Journal of Political Economy.

Bernard Grofman

Filmed and Interviewed by Jeffrey Reichert for a documentary film covering the 2008 Prop 11 referendum and redistricting methods, February 2009. The film appeared as Gerrymandering the Movie,

a documentary briefly playing in movie houses in New York City and elsewhere in Fall 2010. Approximately two minutes of my remarks were incorporated into the movie.

Member, Administrative Advisory Board, University of California Center, Sacramento
Director, Center for the Study of Democracy, UCI Interdisciplinary Organized Research Unit
1991-present, continuing service on Editorial Board, <u>Public Choice</u>
1996–present, continuing service on Editorial Board <u>Electoral Studies</u>
2008-11, International Advisory Committee, Centre for Voting and Parties, University of Copenhagen
2010-12, International Advisory Board, <u>Homo Oeconomicus</u>

Kimberly Jameson

Section Editor for *The Encyclopedia of Color Science and Technology* (Springer Publishers), section on *Color Cognition and Language* (including more than 35 top-tier research scientists contributing section entries).

Continued organizing and presentations during 2010-2011 of the discussion group on Cognition and Color. An active multidisciplinary group of faculty, students and postdocs that holds regular (weekly or bi-monthly) meetings on topics related to the mathematical modeling and empirical investigations of color cognition and perception.

Ad Hoc Reviewing:
    Journal of Vision
    Vision Research
    National Science Foundation

Robin Keller

Best Reviewer for *Risk Analysis*, 2010 (awarded December 2010).

USC   Appointed Scientific Advisory Committee member, Homeland Security Center for Risk and Economic Analysis of Terrorist Events (CREATE), June 2005-Fall 2010.

Editor-in-Chief, *Decision Analysis,* January 2007-Dec. 2009 (term 1) and January 2010-December 2012 (second and final term).

Committee Member author for "<u>A Risk-Characterization Framework for Decision-Making at the Food and Drugh Administration</u>", <u>http://www.nap.edu/catalog.php?record_id=13156</u>.

National Academies Committee Memberships:

  1. U. S. National Committee for the International Institute for Applied Systems Analysis (IIASA), Board on International Scientific Organizations; appointed as member by Ralph Cicerone, Chair of the National Research Council and President of National Academy of Sciences, January 2007-Dec. 2009 (term 1), January 2010- December 2012 (term 2).

  2. Committee on Ranking FDA Product Categories Based on Health Consequences, Phases I & II, 2008-11.   Under the <u>Board on Environmental Studies & Toxicology</u> in the <u>Studies under the IOM</u>

[Executive Office](#), Institute of Medicine of the National Academies; the IOM is the health arm of the National Academy of Sciences.

UC Service Roles:
  Director, Doctoral Program, Paul Merage School of Business, 7/2009-6/2013
  Operations and Decision Technologies Area Coordinator, Spring 2011.

Natalia Komarova

The UCI Distinguished Mid-Career Award for Research, 2010-2011.

2011: Athletic Director's Faculty Advisory Committee has selected me to be recognized for outstanding faculty achievement.

Michael Lee

Vice-President, Society for Mathematical Psychology.

Simon Levin

Distinguished Alumnus of the Year Award, University of Maryland, College of Computer, Mathematical, and Natural Sciences

The State of the Art in Mathematical Ecology: A Festschrift in Honor of Simon A. Levin's 70th Birthday, April 2011.
Theoretical Ecology 4(2), May 2011. Special Issue in Honor of Simon Levin's 70th Birthday.

Margalef Prize, Government of Catalonia, 2010.

Most Cited Paper 2005-2009, Elsevier's Economics & Finance Journals, Most Cited Articles 2005-2009. For Durrett R. and Levin SA. 2005. Can stable social groups be maintained by homophilous imitation alone? Journal of Economic Behavior and Organization 57 (3): 267-286

R. Duncan Luce

Elected Fellow of the Eastern Psychological Association

Michael McBride

Quoted in David Briggs, "The Groupon Dilemma for Churches: Attracting Members Without Encouraging Cheapskates," Huffington Post, 11 May 2011.

Andrew Noymer

I continue to collaborate closely with IIASA, the International Institute for Applied Systems Analysis in Laxenburg (near Vienna), Austria.

Public service: Member, Metrics Group for California HAI (Hospital Acquired Infections) Reporting

My *PloS One* article was well-covered in the news, including on the *Time* magazine homepage (http://www.time.com/).

Lisa Pearl

Excellence in Undergraduate Teaching: School of Social Sciences, May 2011.

Organizer and faculty leader of the interdisciplinary discussion group Computational Models of Language, 2010-current.

A. Kimball Romney

 Winner of $5000 in an InnoCentive Challenge contest. InnoCentive is a web site that posts Prizes for solving a problem a company or organization is attempting to solve. The subject of the Challenge was Thresholds for Perception of Color Differences. The challenge was to devise a method to correlate quantitative physical measurements of surface reflectance with human perception of the color appearance of that surface. For more information see: http://www.imbs.uci.edu/personnel/romney/romney.html

Donald Saari

Daniel G. Aldrich, Jr. Distinguished University Service Award, UCI.

"Outstanding Contributions to Undergraduate Education" award; UCI Physical Sciences.

Ken Small

Founding President, International Transportation Economics Association, 2011.

Excellence in Refereeing Award, American Economic Review, 2009, 2011.

Padhraic Smyth

Inducted as a Fellow of the Association of the Association for the Advancement of Artificial Intelligence (AAAI), August 2010.

Hal Stern

Editor, Applications and Case Studies Section, *Journal of the American Statistical Association* (2010-2012).

Member, Committee on National Statistics (CNSTAT) (2008-2014) – Committee of the National Research Council of the National Academies of Science that tries to improve statistical methods and information for public policy (just reappointed for second term).

Chair, National Academy of Sciences Committee on National Statistics (NAS CNSTAT) Steering Committee for a Workshop on the Future of Federal Household Surveys.

Douglas White

In September our Complex Causality research team, consisting of myself, Ren Feng (Xi'an University), and Tolga Oztan (MBS), was invited by SFI to take over one of the conference buildings for a two-week open seminar on Complex Causality.

Charles (Ted) Wright

Visiting professor at the University of Otago, Dunedin, NZ, winter 2011.

APPENDIX F
GRADUATE STUDENTS AFFILIATED WITH IMBS

(i)   Current Student Participants and their IMBS Advisors
(* advanced to Ph.D. candidacy;   ** received Ph.D. during year)

Student	Advisor
** Ryan Acton	Butts
Royce Anders	Batchelder
Kalin Agrawal	Batchelder
** Arthur Asuncion	Smyth
** Christopher Balding	Grofman
* Jerry Benzl	Kaminski
Eleanor Brush	Levin
America Chambers	Smyth
Andrew Colopy	Kaminski
* Jonathan Cook	McBride/Saari
Adrian de Froment	Levin
Scott Crawford	Smyth
Tyler Dean	Chubb
Chris DuBois	Smyth
** Stephanie Drew	Sperling
Michael Ernst	Maddy
** Amy Escobar	Hoffman
Matthew Feldman	Narens
Robert Forbes	Narens
Jimmy Foulds	Smyth
Andrew Frank	Smyth
** Iris Franz	McBride
** Shaw Gillespie	Braunstein
Matthew Glass	Maddy
Giorgio Gosti	Batchelder
* Diego Grijalva	Skaperdas
** Assal Habibia	Hoffman
Christian Herrera	Chubb
* David Hewitt	McBride
Harry Hong	Brownstone
* Arvin Hsu	Sperling
** John Hutchins	Smyth
Candice Huynh	Keller
* Lorien Jasny	Butts
Dan Jessie	Saari
Deven Kapadia	Poirier
Ryan Kendall	Saari
** Steven Kies	Chubb
* Jinwon Kim	Brueckner
** Rueben Kline	Grofman/Kaminski
** Vimal Kumar	Garfinkel/Skaperdas
Frederico Llarena	de Figueiredo
Alicia Lloro	Brownstone

*	Phillip Li	Poirier/Brownstone
**	Ling Lin	Sperling
**	Shiau Hua Lin	Dosher
*	Dan Luo	Brueckner
**	Son-Hee Lyu	Sperling
	Joshua Malnight	Uhlaner
	Daniel Mann	Chubb
*	Brian Marion	Hoffman
	Justin Mark	Hoffman
	Tomas McIntee	Saari
	Gregory McWhirter	Huttegger
*	Ray Mendoza	Komarova
	Peter Miller	Uhlaner
*	Hyeok Ki Min	Skaperdas
*	Arshad Mohammad	Poirier
	Nick Navaroli	Smyth
*	George Ng	Saari
*	Kerem Ozkan	Braunstein
	Tolga Oztan	White
*	Darren Peshek	Hoffman
**	Petrescu-Prahova	Butts
	James Pooley	Lee
**	John Pyles	Hoffman
*	Ashish Rajbhandari	Poirier
**	John Rapalino	Maddy
**	Brian Rogers	Maddy
*	Nilopa Shah	Brueckner
	Ryan Shirah	Uhlaner
**	Kejun Song	Small
**	Hisaaki Tabuchi	Sperling
	Samuel Thorpe	Srinivasan
	Heidi Tucholski	Saari
**	Yogesh Uppal	Grofman
*	Elliott Wagner	Skyrms/Huttegger
*	Yitong Wang	Keller
	Dan Wolf	Kaminski
**	Mike Yi	Steyvers
**	Matthew Zeigenfuse	Lee
*	Shunan Zhang	Lee

(ii) (MA Degrees in Mathematical Behavioral Science during academic 2010-11

Matthew Feldmann
Jonathan Cook

Donald G. Saari, Director
Institute for Mathematical Behavioral Sciences
University of California
Irvine, CA 926797-5100

Dear Don,

Activities while at UCI, 2011:

I spent Jan and Feb at UCI, paid by UCI for Jan and the first half of Feb, and supported by Princeton and on my own grants the rest of the time.

I served on the internal search committee within EEB evaluating candidates for the Environment Institute; met with all relevant candidates; attended seminars, search committee and Faculty meetings; and rendered advice.

Met with EEB senior candidate Michael Lynch to encourage him to come to UCI.

Met regularly with junior faculty in EEB to discuss common interests, and ways to build activities on campus.

Met with a range of other faculty, especially Saari, Frank, and Lander, to discuss common research interests and explore collaborations.

Participated in collaborative research with Adam Martiny and Steve Allison (EEB), including participation in PI meeting for our joint NSF grant.

Delivered a seminar to Systems Biology Seminar on Evolution of Ecosystem Properties, January, 2011

Delivered a seminar to IMBS on Prosociality in Theory and Practice, February, 2011

Attended various seminars and classes (Skyrms-Saari-Narens).

Attended regional NAS meeting at Beckman

Attended Sackler Symposium on Cooperation at Beckman organized by Ayala, Avise and others

Lectured at AAAS meeting on The Challenge of Sustainability, February, 2011

With D. Saari, participated in Napa meeting on Allocation and Sustainable Fisheries, and gave a lecture on Allocation and Public Goods/Common Pool Resources.

Carried out research on various topics.

Watched Ravens lose in playoffs again.

Simon Levin
Professor, Ecology and Evolutionary Biology
Princeton

Date: Fri, 22 Jul 2011 15:00:48 -0500
Subject: Re: annual report letter
From: Willemien Kets <willemien.kets@gmail.com>
To: Donald Saari <dsaari@uci.edu>

Dear Don:

Thank you for a very inspiring time at IMBS. The Institute provided a very stimulating environment, and I am grateful to you, Louis Narens, Brian Skyrms and IMBS for your support.

My visit to the Institute from November 2010 till July 2011, has been most productive. It has helped me to broaden my scope, and to advance my research agenda.

Visiting the Institute allowed me to interact with researchers in mathematical psychology, logic, and sociology, and these interactions were all very important to my research. The interactions with Louis Narens on modeling knowledge, and with Brian Skyrms and Simon Huttegger on reasoning, signalling and game theory helped me to advance my research on bounded rationality in strategic interactions. The discussions inspired me to pursue some new directions, and I am sure they will have a lasting impact on my work. I also very much enjoyed talking with Michael McBride about various issues in economics and game theory. Participating in the IMBS conference on networks and interacting with sociologists was highly valuable for my research in network theory. During my time at IMBS, one of my articles on networks was accepted for publication in Games and Economic Behavior. Last but not least, I greatly enjoyed interacting with the graduate students at IMBS.

The facilities at the Institute, the staff, and research atmosphere were all excellent. Thank you once again for giving me the opportunity to visit.

With kind regards,

Willemien Kets

Date: Fri, 22 Jul 2011 06:27:36 -0700
Subject: there and back again
From: "Mikaela Fudolig" <mfudolig@uci.edu>
To: dsaari@uci.edu

Dear Prof. Saari,

I hope you are having a not-too-hot summer!

It's been almost a month since I returned to the Philippines. As our
school year starts in June, I went back to my teaching duties right after
I came back. Fortunately, the adjustment wasn't too hard, although I do
miss having more time to devote to my research.

Speaking of research, I am already working on a draft on a paper on the
effect of network structure on altruistic behavior within a group of
agents. Hopefully I'll have the draft ready in a few weeks.

Thank you very much for hosting me at the IMBS. I enjoyed attending the
IMBS colloquium, the Social Dynamics class, the Color and Cognition
reading sessions and the weekly Saari's group meetings. I'm also thankful
for the opportunity to attend the two Sackler colloquia, both of which I
found very informative. UCI's computational facilities were also very
useful to my research. I appreciate all the support that you and IMBS have
given me -- I did not feel like an "outsider" at all.

It has been a great experience learning from you, Prof. Narens, Dr.
Jameson, Prof. Romney, Prof. Butts, and the speakers in the colloquia; I
also learned a lot from my fellow graduate students, both in our weekly
meetings and in the Social Dynamics class. I hope that I will be able to
get a chance to see you again, if not at Irvine, perhaps at some
conference (or maybe you'd like to visit the Philippines?).

Sincerely,

Mikaela