



**International Foundation for Research in Experimental Economics**

A Tribute to IFREE: Ten Years of Contributions to Experimental Economics



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# Introduction to IFREE

"IFREE offers a way of thinking about getting things done; it's a source of inspiration that moves people to want to contribute and make things happen. IFREE is largely orchestrated by volunteers, anchored by the IFREE Mission, who are dedicated to paving a growth path of discovery for researchers, learners, visionaries. These volunteers are joined by a small but committed bunch of proven entrepreneurs from the world of hard knocks, who join IFREE as INVESTORS in IDEAS because they like what they see. IFREE must never fail that trust.

IFREE's value in a few words? It incubates creative market-oriented projects that extend the boundaries of economic research, and nurtures thinking outside the traditional economics, education and policy boxes. Research is about discovery. It's about recognizing the importance of market oriented solutions founded on property rights. IFREE supports work that takes the next step and asks: 'What kind of market? How do we create and grow new markets? How do we create property rights? How do emergent orders form, evolve and survive outside-in and top-down attempts at managed change? How do we effect change for human betterment? Hayek argued that 'It's about studying that which is not'-- a task that elicits natural positive responses from the experimental vision for both research and education.

Good teaching is about not knowing exactly what the difference is between when you are learning new things in research and when you are teaching. Education is about creating an environment in which students and researchers discover together and learn from each other. The teacher who is not learning is not teaching. These are the ideas that lay pathways for IFREE-promoted research and education."

...Vernon Smith....

## **IFREE Mission**

To support economic research and education through experimental methods, advancing the understanding of exchange systems and promoting the testing and application of market-based institutions to help solve real world problems.

**IFREE's vision is to change the way people think about economics.**

# A Decade of IFREE 1997 - 2007

## RESEARCH

### **IFREE is funding, has funded, and/or seeks to fund research in:**

- specialization, exchange and property rights
- reciprocity, trust and trustworthiness in personal exchange
- statistical methods and economic modeling for experiments
- financial market bubbles: behavior and modeling
- joint venture property rights
- network markets: electricity, natural gas, gasoline, and water
- mechanisms in e-commerce
- auction design: combinatorial, clock auctions
- anti-trust: bundling and interchange pricing
- policy analysis: pollution emissions, spectrum policy, space policy
- experiments in neuroeconomics

## EDUCATION

### **Scholarships and Fellowships:**

- Graduate scholarships  
This year IFREE is supporting 9 graduate students with full or partial tuition waivers and has supplied research grants for subject payments to 9 advanced students. Over the 10 years since IFREE's inception the number of students supported has averaged 6 per year in each category.
- Pre-doctoral and Post-doctoral fellows, Senior Faculty Visitors  
In 2007, IFREE is supporting one pre-doc visitor and two senior faculty visitors, and over the 10 years since its inception IFREE has regularly supported one pre-doc and one post-doc each year.
- 2 IFREE Distinguished Scholars (since 1998)
- First High School Summer Intern Program 2006: Six student interns participated.
- Second High School Summer Intern Program 2007: Five students will participate.

## OUTREACH WORKSHOPS

### **Graduate workshops since 1995, Undergraduate since 2005, High School since 1997**

- 323 participants from 12 week-long Visiting Graduate Student workshops in experimental economics. Their fields include economics, psychology, philosophy, political science, science, engineering and anthropology.

# A Decade of IFREE 1997 - 2007 *continued...*

- 450 participants from 19 week-long high school student workshops. As with the graduate students, their interests are broad ranging; most are now enrolled at prominent universities.
- 60 from the recently inaugurated visiting undergraduate workshops.
- 21 faculty located at 12 universities, many of whom are alumni of the IFREE graduate workshops and were pre- or post-doctoral visitors at George Mason University or the University of Arizona where IFREE originated.

## **INTERNATIONAL OUTREACH**

- IFREE co-sponsored the International IFREE-Tinker Conference on the Use of Experimental Economics in Resource Allocation in Electricity and Water Markets in Spain (1999).
- Co-sponsored faculty, graduate student workshop at initiation of Experimental Economics Research Center Shanghai Jiao Tong University (2003).
- IFREE 10th Anniversary Conference and Gala: 'Understanding Exchange Systems: 10 Years of Research and Education' (2007).

## **SPEAKER SERIES**

Science of Liberty Speaker Series:

to promote collaborative discussion of market-oriented solutions to contemporary policy issues

## **SOFTWARE AND PROGRAMING**

- Hand held ultra-portable PCs for demonstrations, workshops, seminars
- Experimental economics programmer support (2006--2007)
- Programming in 2006-2007 of 16 teaching experiments for both PC networks and the ultra-portable PCs

## **ASSISTANCE WITH BOOK MANUSCRIPTS**

(expected publication date 2008)

- Economic Systems Design: Market Design Principles and Applications, Dave Porter
- Analyzing Economics Experiments the Right Way (working title), Mark Olson

# About IFREE

## General Information

Inspired originally by the vision of Mary Caslin Ross and work of Vernon L. Smith, the International Foundation for Research in Experimental Economics (IFREE), an education and research 501(c)(3) organization, was established in 1997.

IFREE serves to fund research and national and international workshops in experimental economics, and to support graduate students, post-doctoral fellows, and visiting scholars at George Mason University and other institutions.

### **IFREE's priorities and responsibilities are to:**

- Highlight the pioneering approach to economic understanding and the unique approach to education that grew out of the development of experimental methods in economics.
- Support research and education that continues that development.
- Conduct educational outreach into broader communities of people in business and government.

### **Characteristic Principles underlying IFREE-supported Activity:**

- Decentralized knowledge and efficient coordination require free choice among individuals governed by rules respecting limited resources and constrained by the freedom of choice of others.
- "Know-how" knowledge in society is dispersed across individuals in all social systems.
- Diversity of preferences, knowledge, and skills is the hallmark of all markets and social systems.
- Free choice allows human social systems to explore and discover the opportunities through which all can achieve increasing gains from exchange through the specialization enabled by exchange.
- Personal and impersonal exchange systems that have coevolved with knowledge/skill specialization are the only known engines of wealth creation. Market experiments enable us to better understand how institutions matter because the rules matter, and how rules matter because incentives matter.
- Personal social exchange systems importantly complement market exchange systems. Both share the ancient principle of mutual giving and receiving, but are differently expressed as reciprocity in social exchange, and property rights supported by the rule of law in market exchange.
- Product and service markets are far more effective than standard economic theory predicts. In both laboratory market experiments, and in the development of new field applications, dispersed private information is sufficient for rule-guided action. The important research question is how should the rules vary with circumstances?

# About IFREE *continued...*

- Markets can be structured so that they are self-regulating and self-ordering to create new long term value, but the structure of (property) rights to take action must honor technical features that vary across different industries and physical environments. This requires "test bedding" (try it before you fly it) in both the laboratory and the field to understand new applications.
- Markets, most importantly, constitute discovery processes.

## Experimental Overview

### Experimental Economics Makes it Possible to:

- Test the limits of existing economic principles using motivated human subjects interacting in laboratory or field environments.
- Test assumptions about human behavior in personal social and impersonal market exchange systems.
- Test the predictive power of traditional models of exchange and decision-making, and explore the form and meaning of rationality in new and changing circumstances.
- “Test bed” new self-regulating and self-ordering market and resource management systems both in the laboratory and in field applications, recognizing that their technical and institutional features must be adapted to different industries and physical environments.
- Study the means whereby the inherent decentralization of information, knowledge and skills can be coordinated for improved performance and human betterment.
- Study what is not (i.e., arrangements that do not now exist), to better understand those that exist, and ask if and how what exists can be made more effective.
- Explore and understand counterfactuals—the "what if," "what might have been" or "what might be" questions—which cannot be observed in life. Experiments can help us to investigate and enable us to better understand "what is not."
- Engage with those close to real world problems where markets have not previously existed to define the problems needing attention, and design and test-bed solutions before the solutions are implemented to help avoid or reduce costly mistakes.
- Seek more effective decision or property right arrangements within working systems, such as the internet and other forms of shared goods and services.
- Build electronic exchange mechanisms (i.e., rule systems) for markets in industries such as electric power, water supply and transportation networks, financial instruments and resource management within firms.

# About IFREE *continued...*

- Explore alternative ways in which markets can be structured for self regulation.
- Establish better integration between field and experimental studies so that each can inform and enhance the other.
- Work to understand both the seen and the unseen elements that affect the behavior of markets and other social systems.

## **What IFREE Supports**

### **Laboratory and Field Research:**

- Study of exchange systems, both personal and social which have evolved in families and small groups, and in the impersonal market institutions of the world.
- Study and extension of decentralized market solutions to the design of new resource management systems and eventually policies that improve the effectiveness of economic performance.
- Study and use of new and evolving tools of brain science for making more visible certain aspects of brain function that affect human sociality and performance, but that have previously been inaccessible to experiment and direct observation.

### **Education and Outreach:**

- Apprenticeship-based, hands-on learning in markets and group decision processes using laboratory technology for students at all levels from the U.S. and other countries that are a part of team research projects working with teaching/research faculty at George Mason University.
- Workshops in hands-on experimental learning methods for high school students and teachers, undergraduate and graduate students at GMU and elsewhere around the U.S. and the world, and for practitioners in industry and government.
- Development of educational software and transferable learning modules for use in the classroom, outreach demonstrations and undergraduate and graduate student workshops.
- Speaker seminars in experimental economics held at GMU for graduate students, faculty, and visiting scholars and other interested parties.
- Conferences and events which promote the timely understanding of the application of experimental economics to real world problems.

# A Tribute to IFREE

## IFREE Alumni

### **Stephen V. Burks**

Associate Professor, Division of Social Science, University of Minnesota, Morris

I came to the 1998 summer boot camp for grad students in Arizona as an economist who was intensively studying the trucking industry with conventional techniques. After you, Kevin, Steve, and the rest of the boot camp team converted me to the use of experimental methods, I told you all that I was inspired to go out and do experiments in the field with truck drivers.

Well, it took several years of development work, but a large team of researchers that I organized is now in the middle of a multi-year project, part of which involves running 1,000 truck drivers through a battery of 6 experiments, along with some other measures, and then following their work lives for two years. I'll be proselytizing for the use of field experiments to the industry studies community, with a talk about the project, this April at the Sloan Industry Studies Annual Conference in Boston.

I credit the Arizona boot camp as one of the formative experiences that led me to develop this project, in collaboration with my co-investigators. Thanks again to you and the boot camp team for making the opportunity available!

### **Terence Burnham**

Research Scientist, Program for Evolutionary Dynamics, Harvard University

IFREE's mission "is to change the way people think about economics." This is absolutely perfect. Economics is in a Dickensian state as being both the best and the worst social science. It is at its best when it seeks the truth about human behavior, and when it builds institutions to augment the best aspects of human nature. Economics is at its worst when it theorizes about mythical people and when it loses sight of the individual. By relentlessly focusing on the empirical aspects of behavior, and keeping the individual at the center, IFREE is an important force for improving economics and more.

### **Cary Deck**

Assistant Professor, Department of Economics, University of Arkansas

The support of IFREE has been invaluable during my early career. While I was a graduate student, my IFREE fellowship afforded me the opportunity to work on several of my own projects, laying the basis for much of my work as a junior faculty member. The papers that resulted from my IFREE sponsored research have been published in several leading academic journals. In addition to these direct benefits to my own work, IFREE has enabled me to interact with many other experiential economists. This includes the senior researchers from whom I gained insight while providing research assistance, the numerous visiting IFREE scholars, and the participants in the graduate student workshops in which I have presented. In sum, IFREE has opened doors for my experimental economics research at every juncture.

# A Tribute to IFREE *continued...*

## **Kyle Hampton**

Lecturer, Department of Economics, University of Hawaii at Manoa

Through their generous financial support, IFREE provided me the freedom to pursue research projects of my own design, a distinctly rare privilege for a pre-doctoral student in a technical field. But perhaps even more important was their generous sponsorship of the Vernon L. Smith Workshops in Experimental Economics. In the course of my involvement with the workshops, I was able to see firsthand the potential for economic experiments to demonstrate the power and beauty of economics to young people, an experience that left me as inspired as the students themselves.

## **Cathleen Johnson**

Lecturer, Department of Economics, University of Arizona

My first association with IFREE was through a graduate workshop in the summer of 2000. From that experience, I returned to my new job at a policy research not-for-profit in Canada on fire and wanting to do experiments. I was in the right place at the right time. With the help of Catherine Eckel and Claude Montmarquette, I ran my first experiment which helped inform the implementation of large random assignment experiments on human capital investment by the poor. Several months later, Mary Ross contacted me and proposed that I return to Arizona for an IFREE funded post-doc, the Gilder-Humphreys Post-doctoral Fellow. Included in the post doc was a small pot of money for subject payments. Cary Deck and I made good use of those funds, using them to support the first experiment published on network formation. The experiences I had at the workshop and during my postdoctoral study period have continued to pay. I have continued to design and implement experiments for informing public policy in Canada in the areas of human capital development, matched income and tax revenue, and rent seeking in innovation. In addition, I have been able to organize and participate in several conferences and talks aimed at policy makers showing the virtues of experimental evidence.

## **Céline Jullien**

Assistant Professor, Department of Economics, University of Grenoble

Vernon Smith and IFREE's support gave me the fabulous opportunity to participate in the 3rd Annual Visiting Graduate Workshop in Experimental Economics in Tucson, Arizona in 1997, and to do a post-doc at the Interdisciplinary Centre for Economic Science in Arlington a few years later in 2003. The workshop gave me the chance to learn a lot on the methodology of experimental economics, and to complete my Ph.D. in economics using market experiments. Later, the post-doc gave me the possibility to work with remarkable members of the laboratory such as Professor Steve Rassenti, and Abel Winn, a graduate student at the time. I learned and discovered new research issues in the electric power market design on which I am still working. This excellent working environment also gave me the occasion to meet people outside the Centre like Douglas Hale from the Department of Energy, Dean Williamson, economist at the Antitrust division, and Lynne Kiesling, from the Reason Public Policy Institute with whom I am still collaborating. Not only has this support given me great professional possibilities, but it also contributed to my personal accomplishment.

# A Tribute to IFREE *continued...*

Washington DC, Dupont Circle, the Smithsonian, the Independence Day are all among my best memories, as well as animated conversations with colleagues who became friends. Finally, I would like to express my sincere gratitude to Vernon Smith and the foundation for what they offered me. I was at a crossroads in my career, and this opportunity gave me the necessary impulse to become a professor of economics!

## **Praveen Kujal**

Associate Professor of Economics, Universidad Carlos III de Madrid

IFREE has been instrumental in advancing my experimental research over the last few years. My first interaction with IFREE started in the organization of an international conference (jointly with Universidad Carlos III, the Tinker foundation and IFREE) in Madrid, Spain, in June of 1999. Policymakers and economists were brought together to discuss water allocation problems. A competitive grant from IFREE started my experimental research on water allocation using market mechanisms. This year I have had the opportunity to visit ICES and have started several research projects with faculty members. The stay has truly benefited me in terms of advancing my long latent (experimental) research agenda. This would have been only partly possible without the support of IFREE. Further, two of my Ph.D. students from Universidad Carlos III have attended the IFREE summer school. Needless to say, they greatly benefited from the workshop.

## **Robert Kurzban**

Assistant Professor, Psychology Department, University of Pennsylvania, Philadelphia

After receiving my PhD from the University of California in 1998, I was supported for two years by IFREE as a postdoctoral fellow. During this time, I was given freedom to pursue my research interests and, much more importantly, had the opportunity to interact with members of the community who helped me to expand the conceptual tools and methodological techniques at my disposal. The value of these for my growth as a scientist and researcher cannot be overstated. By working with people with some of the sharpest minds it has ever been my pleasure to know, I was able to approach research questions from multiple perspectives, allowing me to gain traction on issues that would have been far more difficult if not impossible without the breadth of perspective that my interactions at IFREE afforded. The results for me have been both substantial and tangible. The IFREE-sponsored research I conducted, and the work that has proceeded downstream from it, played a key role in helping me obtain my current position, and continues to allow me to conduct research that has been very well received by the academic community. The training that I received, with its emphasis on experimental economics, supplementing my training in psychology, has allowed me to do genuinely interdisciplinary research that I hope will continue to be of value to the broader scientific enterprise in which we are all engaged.

## **Jim Murphy**

Rasmuson Chair of Economics, University of Alaska Anchorage  
Associate Professor, University of Massachusetts Amherst

Attending the IFREE Graduate Student Workshop in 1998 opened doors to an exciting new world.

## A Tribute to IFREE *continued...*

Experiments help to make economics come alive and seem even more useful to today's pressing policy debates. My experiences with the folks associated with IFREE have fundamentally changed the way I approach my research and teaching. It has enabled me to think more broadly about institutions and the design of new policies, including water markets in the western US, common-pool resources in rural Colombia, fisheries management in Alaska, and water quality trading in Australia. Without the generous support of IFREE, none of this would have been possible. I will always be grateful for the opportunities that Vernon Smith and IFREE have given me. (I attended the IFREE Graduate Student Workshop in 1998; was a 1998-99 IFREE Visiting Pre-Doctoral Scholar, University of Arizona; and I presented at the IFREE Graduate Student Workshop in 2001-2004, and 2006; I plan to present in 2007 as well).

### **Ryan Oprea**

Assistant Professor in Economics, University of California, Santa Cruz

As an IFREE fellow I was given support that enabled me to focus all of my energies on learning how to use experimental methods to study economic problems. IFREE also generously funded much of my early research, allowing me to not only learn first hand how to conduct experimental research but also to get a start as a published researcher. It is no exaggeration to say that IFREE was an indispensable part of my development as an experimental economist. Simply put, no other organization provides the kind of support and counsel that IFREE does.

### **Mary Rigdon**

Assistant Research Scientist, Institute for Social Research, University of Michigan--Ann Arbor

I held an IFREE Post-Doctoral Fellowship from 2001-2002 at George Mason University. During my time as a post-doc, I was able to extend and build on the work that I began in my dissertation on how and why people reach cooperative and mutually beneficial outcomes in bargaining environments that favor no exchange at all. In that year, four papers from that research were written: one on labor markets (published in the Proc. National Academy of Sciences in 2002); one testing between fairness-based models and intentions-based models of reciprocal behavior (joint work with Kevin McCabe and Vernon Smith, published in JEBO in 2003); one on how sorting-and-matching rules that cluster populations of cooperators together sustain trusting/trustworthy behavior (joint work with Kevin McCabe and Vernon Smith, to appear in Economic Journal in 2007); and an overview of some of our results in the trust game (published in an edited collection in 2002). I also wrote a substantial grant proposal for a large set of experiments testing how punishments and rewards impact off-equilibrium cooperation in bargaining (a project that is still on-going); the National Science Foundation funded the proposal the following year.

I presented some of this work that year at several conferences (including the Economic Science Association meetings and the American Economic Association meetings) and gave invited talks at Tilburg University (Netherlands), Charles University (Prague), and The University of Texas at Austin. Most importantly, the fellowship afforded me ample research time, a productive environment, and the opportunity to interact with remarkable research colleagues at ICES.

# A Tribute to IFREE *continued...*

## **Karl Schurter, 17**

Senior, Thomas Jefferson High School for Science and Technology, Alexandria, VA

I am forever indebted to IFREE for laying open so many opportunities with its educational outreach programs. I was a sophomore in high school when IFREE first introduced me to experimental economics through a fun and stimulating workshop. Since then, IFREE and its members have helped cultivate my interest in experimental economics to the point where I am now conducting original research as a senior in high school. Their enthusiasm and guidance has created the perfect learning environment at every step of the way. I am sincerely grateful for everything that IFREE has done for me and everything they will continue to do for other young minds.

## **Bart Wilson**

Associate Professor of Economics, George Mason University

Without IFREE's generous support for my career, first as a John M. Olin Pre-doctoral Fellow and then as post-doctoral scholar and professor, my thinking as a teaching and researching economist would have tracked the traditional knowledge base of the field. My experimental designs would have remained safe and (hopefully) acceptable to the National Science Foundation. IFREE, however, supported my first attempt to try something different and implement a near continuous-time market to understand e-commerce pricing strategies. I didn't realize that taking this incremental procedural step would permanently alter the trajectory of my thinking about competition in markets. From these and subsequent experiments I began to see market behavior, not through the lens of conventional static models that I dutifully learned as a student, but as a dynamic discovery process. Once on that path, experimental economics became a way for me to work on how I understand a world shaped by exchange. I no longer came to form a research question as "Does this stylized model organize behavior?" Rather, the operative question became "Why do we observe the exchange systems that we do?" I began to see the genius of the Scottish Enlightenment—economics as emergent orders—vibrantly come to life in the laboratory. For over 8 years in workshops for high school, undergraduate, and graduate students, IFREE has supported my experimentation with how to use experimental economics to teach economics. In addition to learning-by-doing the technique and methods of experimental economics, these workshops uniquely encourage thinking about economics as an exploration of rule-governed orders of exchange. IFREE has also generously funded software development and a portable laboratory of hand-held computers on which to conduct experimental economics seminars with practitioners, policy and educational groups. These programs continue to be some of my most rewarding and fun experiences with teaching. Thank you.

## **Abel Winn**

Director of Experimental Economics, Market Based Management Institute,  
Wichita State University

As a graduate student at George Mason University, I wanted to write my dissertation on the effects of fiat currency inflation in an experimental economy. The required experimental design was sufficiently large that gathering the necessary funding (well over \$20,000) could have proved a big obstacle. As a graduate student I

## **A Tribute to IFREE** *continued...*

was in no position to fund the experiments myself, and obtaining sufficient grants from a number of funding institutions would have been both time consuming and uncertain. However, IFREE was willing to extend a grant that covered the full cost of the experiments, and allowed me to complete my research in a timely fashion. The degree I earned was a real asset in allowing me to advance at my place of employment at the time, Booz Allen Hamilton. More importantly, the experience I gained from the research IFREE funded has been invaluable as I oversee the development of an experimental economics laboratory at Wichita State University.

### **Erte Xiao**

Post-Doctoral Fellow, Department of Psychology, University of Pennsylvania

My career progress and academic growth are inseparable from the great support of IFREE. With little knowledge of experimental economics, I started my journey of pursuing a Ph.D in economics in the United States. In Professor Daniel Houser's class I became fascinated by research in experimental economics. I was fortunately able to receive support from IFREE and to join Professor Vernon Smith's research group in ICES. In 2003, IFREE funded my first experimental research project. Together with other faculty in ICES, I used experiments to investigate why monetary punishment might reduce cooperation. Since then, I have been funded by IFREE to conduct several other experimental projects in the area of punishment, trust, cooperation and emotion. One of the works was published in PNAS in 2005, and several other papers will be published over the next months. IFREE funding also enabled me to present my research in many conferences in the United States and abroad. IFREE's support helped me to attend many summer schools in the United States and Europe, where I met students and faculty from all over the world and who have similar research interests. All these experiences, I believe, will have great benefit for my future career. In 2006, I earned my Ph.D. and was offered a post-doctoral fellowship at University of Pennsylvania, including an appointment at the Wharton School. This is an excellent environment for me to continue my research in experimental economics. I would like to thank IFREE for opening doors to many great opportunities that have helped to position me for a successful academic career.

### **Artie Zillante**

Assistant Professor, Department of Economics, University of North Carolina

I was an IFREE post-doctoral scholar for the 2004 and 2005 academic years. The time I spent in that position allowed me to gain a broader view of the experimental methodology due to the depth of knowledge and experience provided by the surrounding research faculty. IFREE also provided resources that allowed me to conduct additional experimental sessions for research from my dissertation, and five new research projects were either funded by IFREE or spawned from contact with individuals associated with IFREE. In addition, my participation as an instructor in the summer high school and graduate workshops sponsored by IFREE aided in my development of a Master's level course on game theory and experimental economics at my current assistant professor position in the economics department of UNC-Charlotte. An undergraduate course devoted solely to experimental economics is currently being developed and plans are being made to begin a week long summer workshop for high school students, modeled after the IFREE summer workshops, in the Charlotte area. As one can see, the impact of IFREE on both my scholarly and pedagogical activities has been extensive.

# IFREE Distinguished Scholars

## **Kevin McCabe**

Professor of Economics, Law, and Neuroscience, George Mason University  
Director of the Center for the Study of Neuroeconomics  
Adjunct Investigator at the National Institutes of Health

Looking back over my nine years as an IFREE Distinguished Scholar, three things come to mind: peace of mind in knowing that I wouldn't have to tailor my work to the demands of others, gratitude in knowing an anonymous investor thought my work in neuroeconomics, then just beginning, was worth investment, and third, encouragement and opportunity that has come during challenging times when difficult roadblocks appeared but I was able to "look for the silver lining."

Two research projects stand out over this time. Upon receiving the fellowship I turned my attention to understanding how to incorporate brain imaging into experimental economics. I joined the regular meetings of the Cognition and Neuroimaging Laboratories at the University of Arizona and learned how to design and run a neuroimaging experiment. In 2001 I published a paper with IFREE scholars Daniel Houser and Vernon Smith and CNL scholars Lee Ryan and Ted Trouard, in the Proceedings of the National Academy of Sciences with the title "A Functional Imaging Study of Cooperation in Two-person Reciprocal Exchange." This was the first paper to use functional Magnetic Resonance Imaging to test with functional brain activation data the hypothesis that people use theory-of-mind in order to cooperate in trust and ultimatum settings; it has been cited over two hundred times.

This research project has continued with another highly cited joint publication by Mary Rigdon, Vernon Smith and me in 2003 with the title, "Positive Reciprocity and Intentions in Trust Games." This paper provides a clear behavioral demonstration of the role of theory-of mind in promoting trust relationships by studying reciprocity behavior in voluntary and involuntary trust games. After moving to George Mason University I've continued our research on the neuroeconomics of trust with Jordan Grafman at the NIH and Luan Phan at the University of Chicago. Jordan Grafman, Frank Kruger (a postdoctoral student at NIH) and I are in the process of finishing a paper with the working title "Neural correlates of conditional and unconditional trust in two person reciprocal exchange," which we plan to submit with co-authors to Science within the next few weeks. This paper suggests that there may be two approaches to maintaining a trust relationship over time (Conditional and Unconditional) that use different neuronal systems and have different performance characteristics for partnerships. Joint work with Luan Phan and others has resulted so far in the abstract to be presented to the Society of Biological Psychiatry meeting, May 2007, with the title, "Limbic Reactivity to Partner Reputation in Social Phobia: fMRI of the Trust game." In this research we find an exaggerated amygdala activation in social phobics which helps identify the key role of the amygdala in evaluating social risk.

My second research project, started at George Mason University, is research in law and experimental economics. This research program was started with a joint research paper with IFREE Distinguished Scholar Stephen Rassenti, undergraduate Laura Inglis, and other co-authors in examining the incentives for the pretrial settlement of tort cases in a publication in the Florida State University Law Review, 2005, with the title "Experiments on the Effects of Cost-Shifting, Court Costs, and Discovery on the Efficient Settlement of Tort Claims." In this research we find that individuals are rational with respect to exogenous influences on incentives, but seemingly less rational in their negotiations with each other as they leave the bargaining table

## IFREE Distinguished Scholars *continued...*

to pursue a court award with a lower expected return. Fee shifting rules designed to improve settlement, such as California rule 998, only make matters worse. Follow-up research being written up for publication strengthens these results and makes clear some of the unintended consequences tort-reform may have on the structuring of attorney incentives.

IFREE funding has allowed me to work with many students. Some of those include undergraduate Ming Hsu who worked on the 2001 neuroeconomics paper at the University of Arizona, went on to do his graduate work at Caltech, and is now a fellow at the Beckman Institute, and undergraduate Laura Inglis who co-authored the tort paper at George Mason University and is now pursuing her Ph.D. at the University of Oxford. Graduate student Steve Saletta has been working with me in neuroeconomics and has been awarded a NIH post-doctoral fellowship starting next year. Other graduate students I've worked with include Dr. Mary Rigdon now at the University of Michigan, Dr. Anna Gunnthorsdottir now at the Australian Graduate School of Management, Dr. Cary Deck now at the University of Arkansas, Dr. Ryan Oprea at the University of California, Santa Cruz, and Dr. Erte Xiao at the University of Pennsylvania.

It is clear to me that my IFREE fellowship has provided me with greater recognition in the academic community, and good reputation has enabled me to venture forward with reputable scholars elsewhere. I've helped start a number of joint research projects with scholars at the Baylor Medical Center, the University of Chicago, Harvard University, and the National Institutes of Health. More recently, I've been asked to play an organizing role in a number of conferences in neuroeconomics, and I am frequently asked to write summary articles in neuroeconomics for encyclopedias, reference books, and such journals as the Philosophical Journal of the Royal Academy of Science. With the formation of the Neuroeconomics Society in 2003, and a growing membership of over 150 academics, I think there is no question that my outreach effort to build the new field of neuroeconomics has paid off. More important to me is the founding of the Center for the Study of Neuroeconomics at George Mason University together with the opening of a state of the art imaging center at the Krasnow Institute.

### **Stephen Rassenti**

Professor of Economic Systems Design, George Mason University  
Director, Interdisciplinary Center for Economic Science

As an engineering graduate student in 1980 I was inspired by the force and potential of Vernon Smith's research agenda, and in the years that followed I was attracted by the opportunity to develop the discipline we now call Economic Systems Design. Simply put, ESD studies how efficient resource allocation can be accomplished in very complex economic environments. During the past 10 years under IFREE's support, and thanks to an anonymous investor who has provided for the yearly stipend to me, I have been encouraged to pursue cutting edge research in the design and testing of smart computer assisted markets while directing the Interdisciplinary Center for Economic Science at George Mason University.

My interests have broadened to include topics in law and economics and antitrust litigation. As part of a team which includes IFREE Distinguished Scholar Kevin McCabe, we studied incentives to settle damage

## IFREE Distinguished Scholars *continued...*

lawsuits before a court hearing is undertaken. I recently negotiated a contract with a private consortium led by Verizon, then developed and organized the research effort devoted to understanding the costs (or benefits) to consumers of allowing vendors to tie the purchase of various goods or services together under a single price bundle.

I remain active in matters of public resource economics. With ICES Professor Dave Porter I recently studied optimal auctions for pollution credit allocation in sequential years (reported in this year's IFREE Board of Advisors meeting). I have just developed a large contract and am currently engaged in organizing experiments which attempt to understand the value and wisdom of government sponsored capacity auctions that guarantee that an adequate amount of electric power generating capacity lies waiting over the horizon for all possible new uses; this is a complicated matter steeped in regulatory belief.

Through IFREE support I have been privileged to be able to invite and work with many IFREE sponsored visiting scholars over the years, some of them present with us in this 10th anniversary celebration. For example, in the earliest IFREE years I collaborated with Massachusetts Professor James Murphy to examine the efficacy of reorganizing California's network of water rights under a market based management scheme. More recently, with Grenoble Professor Celine Julien I investigated the possibility of a market (proposed by Australian policy makers) in which the cost savings received by all buyers in the wholesale market are shared with a consumer who agrees to reduce his load: essentially, a buyers' co-op to mitigate price spikes. Most recently, I have partnered with former IFREE sponsored visitor and Australian consultant Karel Nolles in financing and developing a software platform to examine MBIs (market based instruments) in energy and natural resource economics.

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A multitude of interesting projects have passed in the 10 years that IFREE, in carrying out the wishes of an anonymous investor, has made possible my studies. We have discovered many principles that remain uncommon knowledge in building new economic systems. I have often found myself eating my own words when predicting outcomes in even 'simple' complex environments: the world of unintended consequences in novel markets is rich and dense. Together with Dave Porter and Vernon Smith, an innovative textbook, funded in part through IFREE, is in the works. It will summarize our endeavors in the world of economic systems design.

That is what I appreciate about IFREE support. It affords me the opportunity to work with great people on interesting projects, the opportunity to undertake novel or risky projects or help fund a deserving student, the opportunity to participate as a speaker and mentor in workshops interacting with bright young future stars, the opportunity to benefit from stimulating interactions with visiting international scholars, and the opportunity to create an environment in which I can think freely and then carefully design experiments which can be used to actually change how the world works.

# IFREE 10 Year Financial History

## IFREE 10 Year Financial History (in dollars)

	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>Total</u>
<b>Revenues:</b>											
Contributions	\$272,768	\$722,218	\$783,453	\$458,708	\$227,834	\$728,811	\$417,648	\$455,992	\$730,914	\$668,250	\$5,466,596
Program Service Revenue								64,500	100,432	78,115	243,047
Investment Income	454	20,314	17,505	42,730	45,968	-81,720	146,257	86,515	62,444	155,571	496,038
<b>Total Revenues</b>	<b>\$273,222</b>	<b>\$742,532</b>	<b>\$800,958</b>	<b>\$501,438</b>	<b>\$273,802</b>	<b>\$647,091</b>	<b>\$563,905</b>	<b>\$607,007</b>	<b>\$893,790</b>	<b>\$901,936</b>	<b>\$6,205,681</b>
<b>Expenses:</b>											
Program Services:											
Workshops & lectures		\$101,300	\$109,422	\$126,272	\$116,108	\$62,711	\$99,068	\$82,474	\$114,404	\$159,528	\$971,287
Fellowships & Scholarships		75,000	154,856	194,500	135,698	176,250	175,276	65,330	304,873	548,054	1,829,837
Experimental econ research		27,639		77,935	41,701	7,930	174,171	384,545	202,938	292,548	1,209,407
International conference			132,903								132,903
Other			17,720								17,720
<b>Total Program</b>		<b>\$203,939</b>	<b>\$414,901</b>	<b>\$398,707</b>	<b>\$293,507</b>	<b>\$246,891</b>	<b>\$448,515</b>	<b>\$532,349</b>	<b>\$622,215</b>	<b>\$1,000,130</b>	<b>\$4,161,154</b>
Program & workshop mgmt	4,821	19,612	21,209	23,455	18,764	23,226	62,360	48,865	40,197	27,001	289,510
Fundraising	0	29,377	22,180	19,304	33,257	24,351	8,032	61,686	25,931	7,476	231,594
<b>Total Expenses</b>	<b>\$4,821</b>	<b>\$252,928</b>	<b>\$458,290</b>	<b>\$441,466</b>	<b>\$345,528</b>	<b>\$294,468</b>	<b>\$518,907</b>	<b>\$642,900</b>	<b>\$688,343</b>	<b>\$1,034,607</b>	<b>\$4,682,258</b>
Change in Net Assets	268,401	489,604	342,668	59,972	-71,726	352,623	44,998	-35,893	205,447	-132,671	1,523,423
<b>Net Assets, End of Year</b>	<b>\$268,401</b>	<b>\$758,005</b>	<b>\$1,100,673</b>	<b>\$1,160,645</b>	<b>\$1,088,919</b>	<b>\$1,441,542</b>	<b>\$1,486,540</b>	<b>\$1,450,647</b>	<b>\$1,656,094</b>	<b>\$1,523,423</b>	

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