TIAS
Texas A&M University
Institute for Advanced Study

http://tias.tamu.edu/

John L. Junkins

Presentation on October 1, 2013 to
TAMU International Advisory Board
TIAS Goals
http://tias.tamu.edu/

In harmony with Vision 2020:

• *Attract up to 20 eminent scholars* for 12 Colleges
• *Enrich the intellectual climate & the educational experiences at all levels*
• *Enhance the reputation* of Texas A&M
• *Accelerate research productivity* of Texas A&M

**Overarching Goal:**
*Elevate Academic Excellence and Reputation of Texas A&M to the Top Tier of Public Institutions*
2012-2013 Inaugural Class of TIAS Faculty Fellows

Jay Dunlap
Dartmouth University
Genetics
National Academy of Science

Peter Liss
Univ of East Anglia, UK
Geoscience
Fellow of the Royal Society

Alan Needleman
University of North Texas
Engineering Science
National Academy of Engineering

Aleda Roth
Clemson University
Business
Lifetime Achievement Award in Business

Vernon Smith
Chapman University
Economics
2002 Nobel Prize National Academy of Science

KR “Sreeni” Sreenivasan
NY University
Physics, Math & Engineering
National Academy of Science National Academy of Engr
2013-2014 Class of TIAS Faculty Fellows

Leif Andersson
Uppsala University
*Animal Genetics*
US National Academy of Science; Royal Swedish Academy of Science

Satya Atluri
Univ of Calif, Irvine
*Engineering Mechanics*
National Academy of Engineering

Claude Brouchard
LSU Pennington Biomed Res Ctr
*Genomics Obesity*
Belgium Royal Academy of Medicine

Christodoulous “Chris” Floudas
Princeton University
*Chemical Engineering*
National Academy of Engineering

Roy Glauber
Harvard University
*Physics*
2005 Nobel Prize in Physics Nat Academy of Science

Roger Howe
Yale University
*Mathematics*
National Academy of Science
Robert Levine
University of Maryland
American Literature & Prolific Author
Editor of North American Anthology of English Literature

Wolfgang Schleich
Ulm University Germany
Theoretical Physics
Academia Europaea
Austrian Academy of Sci Royal Danish Academy

Peter Stang
University of Utah
Supramolecular Chemistry
2011 National Medal of Science
National Academy of Science

TIAS Enables Unique Opportunities For Engagement with these Stellar Scholars Through:
• One-on-one collaborations with faculty and students
• Departmental, College, and University Lectures
• On-going collaborations that extend beyond their on-campus activities ...
Summary of First Fifteen Faculty Fellows’ Credentials

TIAS Has Attracted World-Class Talent to Texas A&M

• Two Nobel Laureates
• One National Medal of Science Laureate
• Six Members of the National Academy of Science
• Four Members of the National Academy of Engineering
• Two Members of the American Academy of Arts and Sciences
• Seven Members (or Fellows) of International (non US) Academies of Science, Engineering, or Medicine
• Plus, numerous other national and international honors, recognitions, medals and prizes
TIAS History

- An outcome of the June 2009 *Academic Master Plan*
- Endorsed by University Leadership (2009 - )
- Approved, Texas A&M Board of Regents, Dec 2010
- 70 Person *Electorate* appointed, Dec 2010
- *TIAS Administrative Council* Appointed, April 2011
- J Junkins Appointed *Interim Director*, Oct 2011
- E Fry Appointed *Deputy Director*, Oct 2011
- *TIAS Advisory Board* Appointed, Nov 2011
- 2012-2013 Faculty Fellow Nominations, Feb 17, 2012
- J Junkins Appointed *Founding Director*, Sep 2012
- Recruitment for 1st Class of Fellows Initiated, May 2012
- 2012-2013 Class of Six Fellows Announced Oct, 2012
- First TIAS Eminent Scholar Lecture, Nov 13, 2012
- 2013-14 Fellows Nominated and Evaluated Nov, 2012-13
- TIAS Gala: Induction of First Class of Fellows, Jan 2013
- 2013-14 Class of nine Fellows announced Sept 2013
- C Fry Appointed *Associate Director*, Sept 2013
Dr. Peter S. Liss has been on the faculty of the University of East Anglia, Norwich, England for more than 40 years and is currently a professorial fellow. He is a Fellow of the Royal Society and is known for his research contributions on the biogeochemical interactions between the ocean and the atmosphere. His research is an integral part of the School’s Laboratory for Global Marine and Atmospheric Chemistry (LGMAC). Liss served as chairman of the International Geosphere-Biosphere Programme (IGBP) for five years and was subsequently chair of its Surface Ocean – Lower Atmosphere Study (SOLAS). He is currently a member of the Science Advisory Council for the United Kingdom Government's Department of Environment, Food and Rural Affairs. He was a member of the United Kingdom’s Natural Environment Research Council for five years, chairing both its Marine and Atmospheric Sciences Boards.

Liss was the first recipient of the Challenger Society Medal, has been awarded the Plymouth Marine Sciences Medal, and the John Jeyes Medal of the Royal Society of Chemistry, and is guest professor of the Ocean University of Qingdao, China. Liss has recently been elected a member of Academia Europaea (The Academy of Europe).

Liss is collaborating with Piers Chapman, department head and professor of oceanography, and other faculty-researchers in the College of Geosciences. He will host a special international geoscience symposium at the Annenberg Conference Center in February, 2013.
Dr. Vernon L. Smith holds joint appointments with the Argyros School of Business and Economics and the School of Law and helps operate the new Economic Science Institute at Chapman University. Smith was awarded the 2002 Nobel Prize in economic sciences for his groundbreaking work in experimental economics and is a member of the National Academy of Sciences. Smith earned his bachelor’s in electrical engineering from the California Institute of Technology, his master’s in economics from the University of Kansas, and his doctorate in economics at Harvard University.

Smith is a distinguished fellow of the American Economic Association, an Andersen Consulting Professor of the Year, and the 1995 Adam Smith Award recipient conferred by the Association for Private Enterprise Education. He received the Cal Tech’s distinguished alumni award in 1996. He has served as a consultant on the privatization of electric power in Australia and New Zealand. In 1997, he served as a Blue Ribbon Panel Member on the National Electric Reliability Council. He is past president of the Public Choice Society, the Economic Science Association, the Western Economic Association, and the Association for Private Enterprise Education. Previous faculty appointments include the Univ of Arizona, Purdue Univ, Brown Univ, the Univ of Massachusetts, and George Mason Univ, where he was a professor of economics and law prior to joining the faculty at Chapman University. Smith has been a Ford Foundation Fellow, Fellow of the Center for Advanced Study in the Behavioral Sciences, and a Sherman Fairchild Distinguished Scholar at the Cal Tech.

Smith will visit Texas A&M on two occasions and offer lectures on economics. These lectures will be relevant to the current international economic challenges.
LEIF ANDERSSON. Professor Andersson is a professor in functional genomics in the Department of Medical Biochemistry and Microbiology at Uppsala University in Uppsala, Sweden. He is also a guest professor in molecular animal genetics at the Swedish University of Agricultural Sciences in Uppsala. In addition, he directs the Animal Genetics component of the Nordic Centre of Excellence in Disease Genetics. His research group has done pioneering work using domestic animals for genetic dissection of monogenic and multifactorial traits of importance to human and veterinary medicine. Andersson earned his bachelor’s degree studying genetics at the University of Stockholm, and he earned his doctorate from Uppsala University. Andersson is a member of the U.S. National Academy of Sciences and the Royal Swedish Academy of Sciences. He is the recipient of the Thureus Prize in Natural History and Medicine, the Linne Prize in Zoology, and the Commission of Trust Award from the Royal Physiographic Society of Lund. Andersson is among the most renowned international leaders in the genomic and molecular studies of domestic animals as models of biomedical genomics. He has carved out a scientific niche based on the concept of “farm animals as model organisms.” The Andersson research group develops and conducts genetic analyses of divergent intercrosses of populations of farm animals, such as the wild boar and domestic pigs, to identify the genes and mutations affecting specific disease traits and the mechanisms by which mutations alter gene function and regulation. He conducts comparative genomic analysis of diversified species of domestic animals to discover the molecular mechanisms underlying traits of biomedical importance in human and veterinary medicine, including study of the genetic background of metabolic syndrome, autoimmune and inflammatory diseases, and colon cancer. His discoveries have provided insights in the fields of genetics, animal breeding, evolution and biomedical research. As a TIAS Faculty Fellow, Professor Andersson will work with faculty and student researchers in the College of Veterinary Medicine and Biomedical Sciences at Texas A&M to discuss strategy to investigate many topics of mutual interest.
ROY GLAUBER.  Professor Glauber is the Mallinckrodt Professor of Physics at Harvard University. Glauber was awarded one half of the Nobel Prize in Physics in 2005 for his contribution to the quantum theory of optical coherence. In this work, he created a pioneering model for photon detection and explained the fundamental characteristics of different types of light, such as laser light and light from light bulbs. His theories are widely used in the field of quantum optics. As an 18 year old undergraduate at Harvard University he was recruited to work on the Manhattan Project at Los Alamos. His work involved calculating the critical mass for the atom bomb. He returned to Harvard to receive his bachelor’s degree in 1946 and his Ph.D. in 1949. Glauber has received many honors for his research, including the Albert A. Michelson Medal from the Franklin Institute in Philadelphia (1985), the Max Born Award from the Optical Society of America (1985), the Dannie Heineman Prize for Mathematical Physics from the American Physical Society (1996). On 22 April 2008, Professor Glauber was awarded the 'Medalla de Oro del CSIC' ('CSIC's Gold Medal') in a ceremony held in Madrid, Spain. Glauber's recent research has dealt with problems in a number of areas of quantum optics, a field which, broadly speaking, studies interactions of light and matter. He is also continuing work on several topics in high-energy collision theory and the statistical correlation of particles produced in high-energy reactions. Specific topics of his current research include: the quantum mechanical behavior of trapped wave packets; interactions of light with trapped ions; atom counting, the statistical properties of free atom beams and their measurement; algebraic methods for dealing with fermion statistics; coherence and correlations of bosonic atoms near the Bose–Einstein condensation; the theory of continuously monitored photon counting and its reaction on quantum sources; the fundamental nature of “quantum jumps”; resonant transport of particles produced in high-energy collisions; and the multiple diffraction model of proton-proton and proton-antiproton scattering. His presence on campus will help promote interdisciplinary research among many fields. He will collaborate with another member of the new TIAS Faculty Fellow class, Wolfgang Schleich, and a multi-college team of faculty and students led by Distinguished Professor Marlan Scully.
WOLFGANG SCHLEICH.  Professor Schleich as a TIAS Faculty Fellow.  Schleich is a chaired professor of theoretical physics and the director of the Institute for Quantum Physics at Ulm University in Germany.  He earned his doctorate in 1984 at the University of Munich, and he has since received numerous accolades for his work.  Schleich is a member of the Academia Europaea, the Austrian Academy of Sciences, the Royal Danish Academy, and the Heidelberger Akademie der Wissenschaften.  He is a fellow of the European Optical Society.  In 2008 he received the Willis E. Lamb Award for Laser Science and Quantum Optics, and in 2002 he received the Max Planck Research Award, to name only a few of his many honors.  He is a Fellow of the American Physical Society, a Fellow of the Institute of Physics, and a Fellow of the Optical Society of America.  Schleich’s research extends across several fields in physics.  His major scientific interests lie in the intersection of theoretical quantum optics with other branches of physics.  Schleich is best known for his research of the physics of cold atoms and analogies to solid state physics.  His work is in harmony with the already strong university expertise in the quantum realm present at Texas A&M University.  He conducts tests of general relativity using cold atoms and, in particular, Bose Einstein condensates.  He investigates the connection between number theory and quantum mechanics and fundamental questions about the theory of measurement in quantum mechanics.  He has studied insights provided by the modern techniques of experimental quantum optics.  While at Texas A&M, Schleich will help promote interdisciplinary and collaborative research within quantum science and engineering.  Schleich will interact with researchers and students within the Institute for Quantum Science and Engineering, which spans across five colleges: Agriculture, Engineering, Liberal Arts, Science, and Veterinary Medicine, as well as numerous departments, from chemistry and mathematics to ecosystems management.  His research collaboration will include applying quantum techniques to solve problems of interest in the multidisciplinary fields within Texas A&M.  Current areas of research include generating anthrax detectors, sky lasers for detecting biochemical pathogens, development of new magnetometers for detecting submarines, sub-diffraction limited imaging, and high power and XUV laser systems associated with generating femto-second impulses.  His lectures will enhance the intellectual community for faculty, graduate students and advanced undergraduates.
PETER J. STANG. Professor Stang is a Distinguished Professor of Chemistry at the University of Utah, and he is a world renowned researcher. In 2011 he was awarded the prestigious National Medal of Science for his contributions to organic supramolecular chemistry. The work allows the construction of intricate molecular framework, the ultimate goal of which is the rapid assembly of nanoscale molecular devices for broad based practical applications. Professor Stang’s research is leading to the design of materials important to information storage, advanced medicines, energy applications and other areas of benefit to society. Professor Stang has received extensive recognition for his scientific achievements. He has been inducted into the American Academy of Arts & Sciences, the National Academy of Sciences, the Chinese Academy of Sciences and the Hungarian Academy of Sciences. Professor Stang has received numerous esteemed awards. In 2012 he was presented the Priestly Medal of the American Chemical Society. In 2010 he received the Paul G. Gassman Distinguished Service Award of the ACS Division of Organic Chemistry and the F.A Cotton Medal for Excellence in Chemical Research. In 2009 he was awarded the Fred Basolo Medal for Outstanding Research in Inorganic Chemistry. In prior years his research earned him, among others, the ACS Award for Creative Research and Applications of Iodine Chemistry, the Linus Pauling Medal, and the ACS George A. Olah Award in Hydrocarbon or Petroleum Chemistry, and the ACS James Flack Norris Award in Physical Organic Chemistry. Professor Stang engages in a significant volume of service, leadership and editorial activities. He has been the editor of the Journal of the American Chemical Society since 2002, and he is a former editor of the Journal of Organic Chemistry. For five years he served on the Board of the American Association for the Advancement of Science. His devotion to scholarship at all levels is evidenced by his being an award winning teacher. Professor Stang began his studies at DePaul University where he received his B.S. degree in 1963. He earned his Ph.D. in 1966 from the University of California, Berkeley and subsequently joined Princeton University as a NIH Postdoctoral Fellow. At Texas A&M, Professor Stang will collaborate with faculty and students in the College of Science, and especially in the Department of Chemistry.
There is an aspect of biology that is both old and very new, a part of biology that is so basic that we all take it completely for granted and consider it just a part of being alive. It is an aspect of human biology that is so pervasive that it affects the activity of every organ and tissue type and virtually every cell in the human body. Moreover, it is an aspect of being alive that we share with nearly every other living thing above the level of bacteria. It’s an area about which we know a great deal at the level of whole organisms, but only recently have come to understand at the level of cells and molecules. It is the biology of time. For most organisms the principal domain for time organization is the 24 hour day, where activities in cells are metered by a circadian clock. Such clocks have arisen at least three times during evolution. This presentation will cover where they are found, how they work, and how molecular interactions at the subcellular level ramify to influence behavior of organisms.
Balance Sheet Crises: Causes and Consequences

Dr. Vernon L. Smith
2002 Nobel Prize in Economics
TIAS Visiting Scholar
March 20, 2013

Major long-lasting economic slumps such as the Depression and Great Recession, and 11 other less severe and relatively short recessions since World War II, have been regularly foreshadowed by declines associated with housing-mortgage market behavior. The most recent calamity is a consequence of the housing bubble and collapse, 1997-2012. Bubbles are commonplace in history, but severe episodes in the U.S. economy are rare and their collapse not anticipated by economic and policy experts. As in the recent case, collapses can lead to a balance sheet crisis in which households spiral into negative net equity as home values fall against fixed mortgage indebtedness, and these conditions—not part of standard economic analysis—are mirrored in households’ lender banks. Various recovery scenarios can be identified, none of them painless.
TIAS Resources & Growth

• We have ~$ to underwrite 5 yrs of TIAS operation => through 2017
  – $500K/yr from the Academic Master Plan
  – $1M/yr from Chancellor, Available University Fund
  – ~$400K from HEEP Foundation
  – ~$300K/yr Cost Sharing From Colleges
  – TBD Funds from development and proposals

• Immediate Plan: Identify and recruit ~5 to 10/yr or more stellar TIAS Faculty Fellows and up to 15 TIAS Graduate Student Fellows

• Substantial endowment (>$50M) sought to allow growth & long term stability:
  – Goal: 20 TIAS Fellows/yr by 2018
  – Strategies for development, including integration with the Capital Campaign, including
    • TIAS Advocates and TIAS Legacy Society
Some Early Outcomes of TIAS

- **Recruitment of TIAS Fellows to Faculty of TAMU:**
  - Dr Sreenivasan accepted 5 year recurring appointment for 2 to 3 months per yr
  - Dr Atluri accepted 3 year appointment of 2 months per yr
  - Dr X accepted 70% permanent appointment at TAMU, 30% prior institution
    => with CRI support, *official announcement soon*
  - Dr Y has made oral agreement to accept a permanent endowed chair that will have transformative impact on the department and college involved
    => with CRI support, *official announcement soon*
  - All four of the above are National Academy members and have stellar portfolios of accomplishment; all are teaming effectively with our faculty and students

- **Visibility**
  - National visibility already, numerous inquiries from peer institutions regarding the formation and operation of TIAS
  - National PR campaign will be conducted over the coming year, but in judicious outlets
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- **Enhance the reputation** of Texas A&M
- **Accelerate research productivity** of Texas A&M

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Elevate Academic Excellence and Reputation of Texas A&M to the Top Tier of Public Institutions