



2009-2010 Annual Report



Challenging the foundation of computer science

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PRESIDENT'S MESSAGE

It is with pleasure that I present the Toyota Technological Institute at Chicago Annual Report for 2009-10, the last that I will deliver as I am retiring as president as of the October 1 Board Meeting this year.

I have served as president since TTIC's inception, and it has been a wonderful and challenging experience. Nothing compares to starting a new institution of higher learning and research, from scratch. The fact that the goal of the Institute, to be world class, is well within reach less than nine years from incorporation as a non-profit entity, is a testament to the hard work and dedication of all of those with whom I have labored.

TTIC started with the support of our Board Chair, Mr. Tatsuro Toyoda, when the Toyota Technological Institute in Nagoya, Japan, began hopes of attracting a world class level of faculty on fundamental computer science to a sister school in the United States. It is a continuance of the Toyoda family's commitment to education and social issues. Support and encouragement from the sister school in Nagoya (TTI) has been crucial. They furnished the endowment that funds our operation in large part.

Our current success and standing is primarily due to our Chief Academic Officer, Dr. David McAllester, who was the first employee of the Institute and who has brought expertise in and excitement for the field of computer science to TTIC. He has spent countless hours building this organization into what it is today. We could not have been successful without the outstanding efforts of Dr. McAllester.

The faculty, staff, and students all are dedicated to doing their best and have helped to shape the positive culture that has developed here. It is one that allows creative freedom, collegiality, and support within the group. They have contributed greatly to TTIC's achievements.

Our partnership with the University of Chicago is also a key component of our success. Working with a world class university that has a history of excellence, setting new standards for education and research, and a future that is as bright as ever has been a big boost to TTIC. The trustees, officers, faculty, and staff of this fine university have supported us at every step as we moved forward.

This year's premier highlight was the award of accreditation from the Higher Learning Commission of the North Central Association of Colleges and Schools. We met all of their requirements and will receive the first visit from them after accreditation in about four years. Our stability, independence, academic standards, and business practices were developed with much effort, and I am sure that TTIC will continue evolving and building in these key areas as it moves towards being a world class institution.

Another memorable achievement for the year was the granting of our first degree to Wonseok Chae. This reflects well on Dr. Chae and the faculty.

A part of me will remain here as I leave, and TTIC will always be with me wherever I am. I am proud of what has been accomplished and what the future holds for the Institute. It is on a path to achieve its goals. It will not be without a few potholes to traverse, or a detour occasionally, but will succeed with commitment, knowledge, and ambition. The Institute will succeed because of the quality of all who are a part of it.

It has been my great pleasure to serve the Institute. I give my best wishes to TTIC and look forward to seeing its continued growth and development in the global education and research community.

Mitsum Nagasawa



NOTE FROM THE CHIEF ACADEMIC OFFICER

The 2009/2010 academic year was a very fulfilling year for TTIC. We became accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools. This means that a degree from TTIC will be recognized as a valid credential by universities around the world. It also allowed us to get a “.edu” domain name and allows visiting scholars to come on J-1 visas. Accreditation took five years and it is a major accomplishment.

We also began this academic year with three new students, five new research assistant professors and two new tenure track professors, Yury Makarychev and Raquel Urtasun. This infusion of new people helped to make the year intellectually satisfying with internationally recognized groups in algorithms, machine learning, computer vision, speech processing, and computational biology. TTIC continues its tradition of academic excellence.

In January 2010 the tenure track faculty held a “retreat” at the private University of Chicago Quadrangle Club (for faculty) to discuss strategic planning for the Institute. In addition to our tenured and tenure track faculty, this meeting was attended by our Dean, Stuart Rice, as well as Steve Stigler, then chair of the University of Chicago Statistics Department. The mission of TTIC includes, “To achieve international impact through world-class research and education in fundamental computer science and information technology”. Due to our small size, it is not possible to have internationally recognized research efforts in all areas of computer science. Faculty agree that it is good if TTIC focus on a collection of areas which exhibit synergy. Ideally, each area in the collection is intellectually relevant to the others. At the same time, the collection of areas should be broad enough that TTIC remains relevant to as many issues in science and engineering as possible. The Institute’s current mix of areas seems well suited but will continue to expand coverage, possibly by recruiting in natural language processing and optimization in the future.

One week after the faculty retreat, TTIC hosted the External Advisory Committee (EAC), consisting of Eric Grimson (Chair of the EE-CS department at MIT), Takeo Kanade (Whitaker Professor at Carnegie Mellon University), Eva Tardos (Chair of Computer Science at Cornell) and Richard Karp (University Professor, Berkeley). The EAC meets every few years to provide guidance and recommendations for the Institute as it progresses and grows. Their recommendations this visit included: hire more senior faculty, establish even closer ties with the University of Chicago, and clarify the tenure process. We are grateful for their guidance which we will continue to seek and take it to heart.

It is with some sadness that we prepare for the retirement of our president, Mitsuru Nagasawa. Mitsuru has been president of TTIC since it’s founding in 2001 and certainly deserves retirement after so much service and such a long and distinguished career. He joined the faculty of Nagoya University from 1951 through 1986, serving as Dean of the Faculty of Engineering in 1980-83. He was a postdoctoral fellow under Stuart Rice from 1959-61. After retiring from the University of Nagoya he served as a professor and then president at TTI in Nagoya. When he retired from TTI in 2004 he continued as president of TTIC. At 87 years old, he undoubtedly deserves a true retirement, but we will miss him greatly.

TTIC is now seven years old and still a relatively young institution. The future for TTIC seems bright. Computation continues to become more and more central to society. Areas like automated speech recognition, translation between natural languages, and self-driving cars hold out the promise of major societal change. TTIC will continue to pursue its mission and to ensure that it is an active part of technological revolutions of the future.

David Mallett

1. BUILDING A FUTURE-FOCUSED FOUNDATION

External Advisory Committee

In January of 2010, TTIC welcomed back the External Advisory Committee (EAC) which met and assessed the Institute's goals and academic leadership initiatives. The EAC's purpose (since creation in 2004,) is to assess TTIC's means and initiatives in the pursuit of prominent researchers, making for a world class Institute.

The report resulting from the January visit commented on the strengths of the existing program, such areas as: strong quality of research by the faculty; excellent leadership from Dr. McAllester and Dr. Rice; achievement of accreditation; and the hosting of key workshops and regional meetings along with the continuance of the Distinguished Speaker Series.

It also made several recommendations, including: recruit a senior faculty member; invest the endowment with the University of Chicago; develop a clearly defined, transparent tenure review process; strengthen the level of staff support; create and share an explicit strategic plan of research; continue to develop junior faculty potential; increase external visibility; and create a more formal EAC visit structure.

The EAC, in summary, stated that: it is impressed by the progress that has been made by the faculty, staff, and students; research progress and future research plans are exciting and relevant; faculty are actively engaged in collaborative research at the forefront of the fields of machine learning, algorithms and related applications; the leadership is committed to the role of TTIC as a leading research center in key areas of computer science; and that TTIC is committed to leveraging opportunities for growth in collaboration with elements of the University of Chicago.

Presidential Search

The Board of Trustees is undertaking a public search for a new Institute President, as Dr. Mitsuru Nagasawa, founding President since 2001, has announced his approaching retirement. With his leadership, TTIC has developed active research and education programs in computer science, has become accredited to grant Ph.D. degrees, and is active in the recruitment of graduate students and outstanding faculty. The Board of Trustees appointed a Presidential Search Committee to accept and review nominations and applications for the position of president, and to make a recommendation to the Board for an appointment.

A Reputation for Strong Research

TTIC strives to produce strong research, and researchers dedicated to the Institute mission and extraordinary fundamental computer science study. The faculty is receiving recognition at conferences, from peer computer scientists, and through grants and awards. As the Institute continues to recruit students who have a passion for ideas, they are making strides in research as well, emphasizing that success is being achieved in the Institute's collaborative and creativity-supported environment.

Upgrading

To ensure that professors, students and staff have their technology needs met, the Institute constantly evaluates its resources, options and upgrades. Recent updates include: expanded cluster to 156 cores; installed a Shared Storage System with 18T of disk space; switched to hosted Google Apps for Institute email, calendar, groups, docs, and sites; and developing applications for use on a Graphics Processing Unit (GPU). Everyone is encouraged to embrace and promote technology expansion and work to keep all services current with the latest technology.

Finance Committee

The Board of Trustees appointed a Finance Committee to review the Institute's investment policies. The Committee will make a recommendation to the full Board at its October 1, 2010 meeting, concerning the direction that should be taken to maintain financial stability, while anticipating the projected growth of TTIC over the next several years.

2. FACULTY AND ACADEMIC ACTIVITY

TTIC Faculty 2009-10

David McAllester, *Professor and Chief Academic Officer*

Umut Acar, *Assistant Professor*

Andreas Argyriou, *Research Assistant Professor*

Shai Ben-David, *Professor Part Time*

Julia Chuzhoy, *Assistant Professor*

Xinyu Feng, *Research Assistant Professor*

Lance Fortnow, *Adjunct Professor*

Tamir Hazan, *Research Assistant Professor*

Benoît Hudson, *Research Assistant Professor*

Joseph Keshet, *Research Assistant Professor*

Karen Livescu, *Assistant Professor*

Yury Makarychev, *Assistant Professor*

Devi Parikh, *Research Assistant Professor*

Nathan Ratliff, *Research Assistant Professor*

Alexander Razborov, *Professor, Part Time*

Anastasios Sidiropoulos, *Research Assistant Professor*

Greg Shakhnarovich, *Assistant Professor*

Sameer Sheorey, *Research Assistant Professor*

Stephen Smale, *Professor Part Time*

Christian Sminchisescu, *Adjunct Assistant Professor*

Nathan Srebro, *Assistant Professor and Directory of Graduate Studies*

Ambuj Tewari, *Research Assistant Professor*

Raquel Urtasun, *Assistant Professor*

Jinbo Xu, *Assistant Professor*

For more information on professors, their area(s) of expertise and professional endeavors, please see Section 4: Research and Responsibility.

Seminars

Seminars are an important part of any academic institution. They are both a way for researchers to promote their research, and a way for researchers to keep abreast of recent developments. They also play an important role in establishing the level of intellectual activity and influx of innovative ideas at an organization: research is more likely to be productive in an active environment with significant interaction between researchers.

The table below lists seminars given at TTIC, many of which are given by speakers from other universities and research institutions. Numerous speakers are part of research reading groups: people presenting papers that are of interest to a particular group, such as the theory group or the programming languages group. Many seminars are advertised outside of TTIC and are intended to be for a broad audience in computer science. In the spring quarter there are also a large number of recruiting seminars which are talks given by candidates for faculty positions. The TTIC Event Calendar can be found from our home page: www.ttic.edu

Speaker	Institute	Title	Date
David Sontag	Massachusetts Institute of Technology	Approximate Inference in Graphical Models using LP Relaxations	7/13/09
Konrad Koerding	Rehabilitation Institute of Chicago, Northwestern University	Perception as Bayesian inference about causes	7/20/09
Wonseok Chae	TTIC	Type Safe Extensible Programming (Dissertation Defense)	8/10/09
Jacob Goldberger	Bar-Ilan University	An effective belief-propagation algorithm for constrained linear least-squares problems	8/3/09
Sivan Sabato	Hebrew University	Reducing Label Complexity using Multiple Instance Learning	8/4/09
Maria Florina (Nina) Balcan	MSR New England and Georgia Tech	The Dynamics of Equilibria	8/24/09
Dan Roth	University of Illinois, Urbana- Champaign	Constrained Conditional Models: Learning and Inference in Natural Language Understanding	9/21/09
Shai Ben-David	TTIC	Does Unlabeled Data Provably Help? Worst-case Analysis of the Sample Complexity of Semi-Supervised Learning	9/24/09
Nat Srebro	TTIC	Modeling, Statistics and Optimization in Machine Learning	9/29/09
Konstantin Makarychev	IBM T.J. Watson Research Center	Sparse Rectangular Representations of Matrix Data	10/5/09
Devi Parikh	TTIC	Research in Image Understanding: Context, Hierarchical Representations and Reverse-Engineering Humans	10/6/09
David McAllester	TTIC	Object Detection Grammars	10/13/09
Benoit Hudson	TTIC	Research in Computational Geometry	10/20/09
Ben Recht	University of Wisconsin-Madison	A simpler approach to matrix completion	10/26/09
Nathan Ratliff	TTIC	Structured prediction techniques for imitation learning	10/27/09
S V N Vishwanathan	Purdue University	A Quasi-Newton Approach to Nonsmooth Convex Optimization	11/02/09
Shai Ben-David	TTIC	Research in Machine Learning and Clusters	11/3/09
Mathieu Salzmann	International Computer Science Institute, Berkeley	Reconstructing Deformable Surfaces: A Convex Formulation	11/9/09
Andreas Argyriou	TTIC	Multi-Task Learning and Data Fusion	11/10/09
Yali Amit	University of Chicago	Statistical Models in Computer Vision	11/16/09
Ambuj Tewari	TTIC	Strong Convexity and Strong Smoothness: Applications to Learning with Matrices	11/17/09
Beata Beigman Klebanov	Northwestern University	Learning with Annotation Noise	11/23/09
Dhruv Batra	Carnegie Mellon University	Beyond Trees: MRF Inference via Outer-Planar Decomposition	11/24/09
Boaz Nadler	Weizmann Institute	Learning from Labeled and Unlabeled Data, Global vs. Multiscale Approaches	11/30/09
Elliot Anshelevich	Rensselaer Polytechnic Institute	Strategic Network Formation and Group Formation	12/14/09
Sorelle Friedler	University of Maryland	A Sensor-Based Framework for Kinetic Data	12/15/09
Amar Subramanya	Google	Semi-Supervised Learning with Measure Propagation	1/4/09

Lance Fortnow	Northwestern University	Bounding Rationality by Computational Complexity	1/11/10
Benjamin Snyder	Massachusetts Institute of Technology	Climbing the Tower of Babel: Advances in Multilingual Learning	1/12/10
John Blitzer	University of California, Berkeley	Learning Correspondence Representations for Natural Language Processing	1/13/10
Karen Livescu	TTIC	Research in Speech Recognition	1/15/10
Ruslan Salakhutdinov	Massachusetts Institute of Technology	Unsupervised Learning of Deep Probabilistic Models	1/19/10
Homin Lee	University of Texas at Austin	On the Learnability of Monotone Functions	1/20/10
Markus Dreyer	Johns Hopkins University	Language Processing with Graphical Models over Strings	1/21/10
Michel Galley	Stanford University	Machine Translation: Re-envisioning the Model Space	1/22/10
John Goldsmith	University of Chicago	Unsupervised learning of natural language morphology	1/25/10
Niv Buchbinder	Microsoft Research New England	The Randomized k-Server Conjecture (Online Algorithms meet Linear Programming)	1/27/10
Miroslav Dudik	Carnegie Mellon University	Maximum entropy and applications in natural and social sciences	1/28/10
Jinbo Xu	TTIC	Probabilistic Graphical Models for Protein Structure Prediction	1/29/10
Martin Wainwright	University of California, Berkeley	Statistical inference in high-dimensional settings: A unified analysis of regularized estimators	2/1/10
Han Liu	Carnegie Mellon University	Nonparametric Learning in High Dimensions	2/2/10
Julia Chuzhoy	TTIC	Approximation algorithms and the Max Min Allocation problem	2/5/10
Miloš J. Jovanović	University of Illinois, Chicago	Optimal Control of Hybrid Systems with Applications to Robotics	2/8/10
Grant Schoenebeck	University of California, Berkeley	Understanding the Limitations of Linear and Semidefinite Programming	2/10/10
Raquel Urtasun	TTIC	Non-parametric models for the analysis of human behavior	2/12/10
Ilias Diakonikolas	Columbia University	Approximation in Multiobjective Optimization	2/16/10
Anastasios Sidiropoulos	TTIC	Metric embeddings for topological graphs	2/19/10
Ohad Shamir	Hebrew University	When Quantity makes Quality: Learning with Information Constraints	2/23/10
Sayan Mukherjee	Duke University	Geometry and Topology in Statistical Inference	3/8/10
Yury Makarychev	TTIC	Approximation Algorithm for Maximizing the Algebraic Connectivity of a Graph	3/5/10
Sayan Mukherjee	Duke University	Geometry and Topology in Statistical Inference	3/8/10
Joseph Keshet	TTIC	A New Perspective on Speech Recognition	3/12/10
Mohammad Hossein Bateni	Princeton University	PTAS for planar Steiner forest	3/16/10
Ambuj Tewari	TTIC	Risk, Regularization and Regret: A View through the Lens of Strong Convexity	3/18/10
Brian Y. Chen	Columbia University	Volumetric Dissection of Protein Functional Sites	4/1/10
Alexander Schoenhuth	University of California, Berkeley	Classifying Cancer Tissue by Inferring Systemic Markers	4/2/10
John DeNero	University of California, Berkeley	Large-Context Models for Large-Scale Machine Translation	4/12/10

Amnon Shashua	Hebrew University of Jerusalem	Automotive applications in Computer Vision: Driving Assistance Systems, Present and Future	4/13/10
David Sontag	Massachusetts Institute of Technology	Approximate Inference in Graphical Models using LP Relaxations	4/14/10
Samuel Hasinoff	Massachusetts Institute of Technology	Rich Photography on a Budget	4/15/10
Honglak Lee	Stanford University	Unsupervised Feature Learning	4/19/10
Arian Maleki	Stanford University	Approximate Message Passing Algorithm for Compressed Sensing	5/11/10
Esther Ezra	Courant, New York University	Small-Size Epsilon-Nets for Geometric Range Spaces	5/13/10
Ping Li	Cornell University	Compressed Counting for Estimating Frequency Moments and Entropy of Data Streams	5/17/10
Dhruv Batra	Carnegie Mellon University	Graph-Structured Discrete Labelling Problems in Computer Vision: Learning, Inference and Applications	5/25/10
Leo Zhu	Massachusetts Institute of Technology	Recursive Compositional Models for Computer Vision	5/27/10
Yan Yuan Tseng	University of Chicago	A geometric approach to protein structure, function and evolution	5/28/10
Hisashi Kobayashi	Princeton University and NICT	From the present Internet to a Future Internet	6/9/10
Mathieu Salzmann	University of California, Berkeley	Combining Explicit Constraints and Learning for Non-Rigid Reconstruction	6/10/10
Pawan Mudigonda	Stanford University	LP Relaxation and Move Making Algorithms for Energy Minimization	6/28/10



Institute - Hosted Workshops and Programs

The 2nd Illinois Speech Day

TTIC's Karen Livescu hosted a regional speech research meeting, the 2nd Illinois Speech Day, on May 10, 2010. About fifty people from Illinois and beyond participated. Among the institutions represented, in addition to TTIC, were the University of Chicago, Northwestern University, University of Illinois at Urbana- Champaign, University of Washington, Massachusetts Institute of Technology, and Carnegie Mellon University.

Speech Day consisted of presentations and discussion on the theme of computational models of speech. Presenters included faculty, postdocs, and students at the University of Chicago, Northwestern University, University of Illinois at Urbana- Champaign, and TTIC. Presentations included completed and ongoing work, with the goal of fostering interaction among the sites.

The 3rd Illinois Vision Workshop

Dr. Greg Shakhnarovich hosted a regional computer vision meeting, the 3rd Illinois Vision Workshop, on December 1, 2009. About fifty people from the Midwest and beyond participated. Among the institutions and companies represented, in addition to TTIC, were the University of Illinois at Urbana- Champaign, University of Illinois at Chicago, Northwestern University, the University of Michigan, University of Missouri, University of California Berkeley, Microsoft Research, Carnegie Mellon University, Eastman Kodak, and Cornell University.

Illinois Vision Workshop is a largely informal meeting for vision researchers in Illinois and the nearby Midwest regions. It is organized by Derek Hoiem (UIUC) and Greg Shakhnarovich (TTIC). Areas covered included all aspects of computer vision, and also vision-related work in robotics, graphics, neuroscience and psychophysics, and computational tools potentially useful in vision, for instance from statistics or computational geometry. This is a forum for people to present new, often unpublished work, possibly in progress but mature enough to generate productive discussion.

Seminar Meeting of TTIC and the University of Chicago Dept. of Statistics

In early May, for the first time ever, three TTIC professors (David McAllester, Nati Srebro and Andreas Argyriou), and three Department of Statistics professors (Peter McCullagh, Mary Sarah McPeck and Michael Stein), held an evening joint-seminar, giving short presentations on broad questions of interest in their respective fields and in statistics and machine learning. Open discussion followed the presentations.

The idea for a joint event originated at a TTIC faculty retreat in January 2010. The retreat focused on defining the research areas and mission of TTIC and was attended by Steve Stigler, then chairman of the Department of Statistics. It was clear at the retreat that the research areas of TTIC strongly overlapped with statistics and there should be more collaboration between the two groups.

There has been much recent discussion in the statistics and machine learning communities about the relationship between the two fields. The field of machine learning is newer and has been rediscovering much of statistics. At the same time, it is focused on building software systems in areas not traditionally covered in statistics, such as computational complexity.

Eventually the two institutions decided to use the statistics seminar time slot (Mondays at 4:00 p.m.), for a joint seminar in which people from TTIC and the statistics department would alternate brief (10 or 15 minute) talks. The event was attended by perhaps 100 people, mostly members of University of Chicago and TTIC communities. Talks were brief overviews of research areas, with an emphasis on high level issues related to the relationship between statistics and machine learning. The event was well received and thought-provoking. To facilitate collaboration, the researchers involved hope to move on to joint research projects or new joint-curriculum design.

Academic Laudation

Awards and Distinction by TTIC Faculty

Dr. David McAllester 2010

Dr. McAllester has been awarded the Association for the Advancement of Artificial Intelligence (AAAI) “Classic Paper Award” for his paper titled, “Systematic Nonlinear Planning” with David Rosenblitt, which appeared in the AAAI Conference in 1991. The AAAI Classic Paper award honors the author(s) of paper(s) deemed most influential, chosen from a specific conference year. The 2010 award is given to the most influential paper(s) from the Ninth National Conference on Artificial Intelligence, held in 1991 in Anaheim, California.

Papers are judged on the basis of impact, for example: started a new research (sub)area; led to important applications; answered a long-standing question/issue or clarified what had been murky; made a major advance that figures in the history of the subarea; has been picked up as important and used by other areas within (or outside of) AI; or has been very heavily cited.

Dr. McAllester received his award at the July 2010 AAAI conference in Atlanta, Georgia.

Dr. Lance Fortnow 2009

Dr. Fortnow’s article titled “The status of the P versus NP problem” is the most downloaded article ever for the magazine Communications (Communications of ACM), a fact reported by the New York Times. To see the New York Times report of this, visit: <http://www.nytimes.com/2009/10/08/science/Wpolynom.html>. If you would like to see Dr. Fortnow’s article, please do a search by title in the CACM Archives online.

Internship Program

Summer 2010 proudly marks the sixth anniversary of the TTIC Internship Program. Interns spend approximately three months engaged in a research project in collaboration with TTIC faculty. It is expected that the interns’ projects result in a tangible outcome such as a software system or research paper.

Interested students may apply online at TTIC’s website. Accepted interns are typically Ph.D. students in prominent computer science departments from all over the globe, familiar with the standards and research diligence that TTIC expects, or have collaborated with TTIC in the past.

TTIC financially supports its interns at rates comparable to industrial summer internship positions, and was able to double the number of interns accepted this year, compared to 2009.

The 2010 summer interns



Roland Angst
ETH Zürich



Andreas Geiger
Karlsruhe Institute of
Technology



Daniel Glasner
The Weizmann Institute
of Science



Preethi Jyothi
Ohio State University



Gabrielle Knight
Northwestern University



Jason Lee
Duke University



Angela Yao
ETH Zürich



Rohit Prabhavalkar
Ohio State University



Alexander Schwing
ETH Zürich



Aydin Varol
ETH Zürich



Aravindan Vijayaraghavan
Princeton University



Yuan Zhou
Carnegie Mellon University



Women Mentoring Women

In June 2008, Princeton University hosted a Women in Theory workshop and invited female undergrad and grad students to attend, as well as female scientists (including TTIC's Julia Chuzhoy) to give talks. TTIC also helped to sponsor this worthwhile event.

The workshop organizers suggested that attending students and researchers start a mentorship program. Students who were interested signed up and listed who they wanted to be their mentors. Researchers could review the list to decide who they were interested in mentoring, Dr. Chuzhoy has chosen to mentor: Noga Zewi from Technion, Kshipra Bhavalkar from Stanford and Sudeepa Roy from University of Pennsylvania. All of their research interests are similar. The idea of the mentorship program is that mentors and students discuss their academic progress from time to time, and students can turn to Dr. Chuzhoy for advice or a second opinion on whatever academic matters they want to discuss. It is also viewed as a means to increase "women networking," since it is likely these women will meet each other at conferences and workshops moving forward.

In July 2009, Dr. Chuzhoy invited Noga Zewi, Kshipra Bhavalkar and Sudeepa Roy to TTIC as part of this program. The goal was to get to know each other better, discuss any academic matters they wished to discuss, and do some research. The group worked on the Maximum Independent Set of Rectangles problem. Dr. Chuzhoy found that the students seemed to be very interested in the problem, and they managed to make some progress on it during that short visit.

"I also thought it was important that the ladies get to know each other and bond together. It is not uncommon for a female graduate student to have very few female peers who work in a similar research area," explains Dr. Chuzhoy, who thought that getting to know each other may help them with that. "I think that part worked out really well - it looks like they have become good friends."

3- EDUCATION

The Ph.D. Program

The Ph.D. Program is designed to prepare students for academic or research careers. To complete the program a student must make an original and significant contribution to the field of computer science and this contribution must be described in a Ph.D. Thesis. In addition to the Thesis, there are course and examination requirements to complete the program. The main component of the program is the process by which the student learns to do research and becomes a part of the academic community.

As part of the associated partnership between TTIC and the University of Chicago, students of TTIC can take courses through the University of Chicago and get credit for them, and University of Chicago students can take advantage of classes TTIC offers as well. TTIC's students have taken full advantage of this opportunity. They also have full access to the University of Chicago library system, athletic facilities, the student health center and transportation on campus. Not only does the Institute benefit from the assets of the University of Chicago, but students share in the great rewards of the intimate learning, sharing, and research of a smaller institute while enjoying the opportunities that come with a large university as well.



Student Progress

In one of TTIC's most significant events to date, the Institute graduated its first student with a doctoral degree, and Ph.D. diploma. Student Wonseok Chae, studying under Professor Matthias Blume, successfully defended his thesis and received his diploma in a ceremony in September of 2009. Dr. Chae is currently living and working in San Jose California. TTIC plans to graduate a second Ph.D. student in the summer of 2010.

Student Recognition

As stated above, TTIC's Ph.D. Program is designed to prepare students for academic or research careers. This February (2010), third-year TTIC student Jian Peng, studying under Professor Jinbo Xu, was awarded the prestigious Microsoft Research Ph.D. Fellowship. It's a two-year fellowship program for outstanding Ph.D. students, and supports men and women in their third and fourth years of Ph.D. graduate studies. The fellowship award will cover 100% of Jian's tuition and fees for two academic years (2010 and 2011), provides a stipend to cover living expenses while in the PhD program, a travel allowance for Jian to attend professional conferences or seminars, and the opportunity to complete one salaried internship during the year following the award.

Student Publications, Posters or Abstracts for 2009-10

“Structure and Motion from Road-Driving Stereo Sequences.” Hoang Trinh and David McAllester. The IEEE Workshop on 3D Information Extraction for Video Analysis and Mining, CVPR 2010.

“Low-homology protein threading.” Jian Peng and Jinbo Xu. The Eighteenth Annual International Conference on Intelligent System for Molecular Biology (ISMB2010).

“Fragment-free Approach to Protein Folding Using Conditional Neural Fields.” Feng Zhao, Jian Peng and Jinbo Xu. The Eighteenth Annual International Conference on Intelligent System for Molecular Biology (ISMB2010).

“Sparse Coding for Learning Interpretable Spatio-temporal Primitives.” Taehwan Kim, Raquel Urtasun, Gregory Shakhnarovich. Submitted to NIPS 2010.

“Robust Selective Sampling from Single and Multiple Teachers.” Ofer Dekel, Claudio Gentile, Karthik Sridharan. COLT 2010.

“Convex Games in Banach Spaces.” Karthik Sridharan, Ambuj Tewari. COLT 2010.

“Learning Kernel-Based Halfspaces with the Zero-One Loss.” (Best paper award.) Shai Shalev-Shwartz, Ohad Shamir, Karthik Sridharan. COLT 2010.

“Learning exponential families in high-dimensions: Strong convexity and sparsity.” Sham Kakade, Ohad Shamir, Karthik Sridharan, Ambuj Tewari. AISTATS 2010.

“Online Learning: Random Averages, Combinatorial Parameters and Learnability.” Alexander Rakhlin, Karthik Sridharan, Ambuj Tewari. Submitted to NIPS2010.

“Smoothness, Low-Noise and Fast Rates.” Nathan Srebro, Karthik Sridharan, Ambuj Tewari. Submitted to NIPS 2010.

“Semi supervised learning using density based distances.” Avleen Bijral, Nathan Ratliff and Nati Srebro. Submitted to NIPS 2010.

TTIC Student Body Growth

In the fall of 2004, TTIC matriculated its first three students. Almost six years later, we began the 2009-10 academic year with thirteen students, and anticipate matriculating four more in the fall of 2010.

Financial Support

Full financial support is offered to all students. The tuition for an academic year is \$30,000. All Ph.D. students at TTIC may expect to receive financial support that covers tuition and a stipend to assist with living expenses.



Exchange Students

This year TTIC welcomed one exchange students from the Toyota Technological Institute (TTI) located in Nagoya, Japan. Student Fumiya Haga arrived in September 2009, took TTIC program courses, and returned to TTI in late December.

Fumiya’s area of research is Information Technology. The title of Fumiya’s Introductory Research Report for graduate school was “Analysis of perpendicular magnetic recording signal distribution and its separation by hyper-plane”. This research shows signal separation using support vector machine. He researches perpendicular magnetic recording signal using CDMA, a transmission method used for cell phones. It can make multiple signals into original signals, making it increasingly possible to solve the problem of magnetic head reading multiple lanes.

TTIC remains pleased with the exchange program with TTI, as the experience continues to be a positive success for all involved. As of summer 2010, both institutes have had thirteen students participate in the exchange program, and one more TTI student is scheduled to enroll at TTIC for fall semester 2010.

4- RESEARCH AND RESPONSIBILITY



Research Philosophy

Research is the heart and soul of activities at the Toyota Technological Institute at Chicago. The Institute has an energetic and determined team of professors, visiting professors, assistant professors, and research assistant professors encompassing many areas of research interests, from many countries, and speaking a variety of languages.

With a generous budget, distinguished professors, and an environment that promotes learning and sharing, there are ample opportunities for collaborative research. Being on the campus of the University of Chicago, there is the occasion for close and cooperative research with the University of Chicago Computer Science Department. There are also many guests and visitors who come to give talks and demonstrations and share their research findings, all heightening the feeling of excitement that pulses through the Institute.

The mission of TTIC includes **...achieving international impact through world-class research and education in fundamental computer science and information technology.** The research component of the mission is implemented through high quality research in high impact areas. Currently, there are active research programs in six areas: algorithms and complexity, machine learning, computer vision, speech recognition, scientific computing, and programming languages. There is a plan to pursue some other areas and reclassify these listed, beginning in the fall of 2010. Each of these areas is reviewed, as follows, briefly describing the nature of the area and the strategy for achieving impact in that area. A key part of the strategy for achieving impact in all areas is to foster collaboration and communication between the areas.

Algorithms and Complexity

Algorithms are methods for writing efficient software. Complexity theory is the study of the limits of efficient software. For some problems, one can prove that no efficient software is possible. Complexity is often referred to as the 'theory of computer science', or just "theory". Theory is considered by many to be the most intellectually prestigious area of academic computer science. At many universities, including MIT and the University of Chicago, a significant number of the computer science theory professors have joint appointments in the mathematics department.

Machine Learning

Modern machine learning is mostly based on statistical methods, and at some universities, such as University of California Berkeley, several computer science faculty in the subfield of machine learning have joint appointments in the statistics department. Machine learning has become widely applied, not only to the classical problems of AI, but to a variety of computational problems in other areas such as information retrieval, bioinformatics, stock market predictions, and even optimizing compilers. There is also a significant and developing body of computer science theory for machine learning, and a significant overlap between research in the theory of computation and research in machine learning.

Computer Vision

Computer vision involves getting computers to extract useful information from pictures and videos. It has applications in robotics, surveillance, autonomous vehicles, and automobile collision avoidance. Historically, this is a central research area of computer science.

Speech Recognition

Speech recognition is the problem of understanding what is being said from an audio signal, such as that recorded from a microphone. Speech recognition has applications in customer assistance, automated dictation, and user interfaces.

Scientific Computation

Scientific computation uses computers to facilitate research in older scientific disciplines such as fluid dynamics, weather prediction, astronomy, chemistry and biology. This research often involves simulations of physical systems and nonlinear optimization. Scientific computing, and in particular the study of differential equations, is close to traditional mathematics, and often scientific computing faculty have joint appointments in mathematics departments. Nonlinear optimization is a sub-area where interaction is natural. Optimization is central to many scientific problems, is widely studied in the theory of computer science, and is widely used in AI. It is also hoped that machine learning methods will find significant applications in scientific computing.

Programming Languages

Programming languages studies the languages in which computer software is written and methods for compiling those languages into efficient machine instructions (compilers). Compilers form a special class of computer programs in that they manipulate symbolic expressions. They also perform static analysis, a kind of automated theorem proving, to establish the correctness of certain optimizations. Domain specific programming languages can be developed for areas such as numerical simulation. The static analysis methods used in compilers may have applications in AI and scientific computing where certain optimization methods can yield dramatic (asymptotic) improvements in performance.

Faculty Research Activity



Andreas Argyriou

Research Assistant Professor
www.ttic.edu/argyriou

Published/Submitted Papers

“On Spectral Learning.” A. Argyriou, C. A. Micchelli and M. Pontil. Journal of Machine Learning Research, vol. 11, Feb. 2010.

Talks

“Multi-Task Learning and Data Fusion” Research at TTIC Seminar Series, Nov. 2009.

“Multi-Task Learning and Data Fusion” Purdue University, Dept. of Statistics, Dec. 2009.

“Kernels for Multiple Outputs and Multi-task Learning: Frequentist and Bayesian Points of View” NIPS workshop Title: “Multi-Task Learning and Matrix Regularization”, Dec. 2009.

“Multi-Task learning” Seminar Meeting of TTIC and University of Chicago Dept. of Statistics, May 2010.

Involvement

Reviewing for: AISTATS 2010, ICML 2010, NIPS 2009 Workshop on Optimization for Machine Learning, Journal of Machine Learning Research, COLT 2010, NSF CISE III Program (Data Mining) grant proposals.

Classes/Seminars

Machine Learning Seminar: Presented Lounici, Pontil, Tsybakov, Van De Geer, “Taking advantage of sparsity in multi-task learning”, Oct. 2009.

Structured Prediction Reading Group: Presented V. Koltchinskii, “Sparse recovery in convex hulls via entropy penalization”, June 2010

Miscellaneous

Technical report. A. Argyriou. A Class of Convex Regularizers for Sparse Recovery and Feature Selection. June 2010.



Julia Chuzhoy

Assistant Professor
www.ttic.edu/chuzhoy

Published/Submitted Papers

“On Allocating Goods to Maximize Fairness.” D. Chakrabarty, J. Chuzhoy and S. Khanna. FOCS 2009. Oral presentation.

“An $O(k^3 \log n)$ -Approximation Algorithm for Vertex-Connectivity Survivable Network Design.” J. Chuzhoy and S. Khanna. FOCS 2009. Oral presentation.

“Resource Minimization for Fire Containment.” P. Chalermsook and J. Chuzhoy. SODA 2010. Oral presentation.

“Resource Minimization Job Scheduling.” J. Chuzhoy and P. Codenotti. APPROX 2009. Oral presentation.

Talks

“Allocating Goods to Maximize Fairness” International Symposium on Mathematical Programming (ISMP).

“Allocating Goods to Maximize Fairness” University of Washington, CS Theory seminar.

“Allocating Goods to Maximize Fairness” CMU, CS Theory seminar.

“Allocating Goods to Maximize Fairness” Northwestern University, EECS Theory seminar.

“Allocating Goods to Maximize Fairness” IBM TJ Watson Research Center Theory seminar.

Involvement

Program Committee member of FOCS 2010.

Reviews for: Algorithmica, Journal of the ACM, SIAM Journal on Computing, Theory of Computing, SODA 2010.

Miscellaneous

Mentor for three students selected as a result of the Women in Theory Workshop held at Princeton University. Noga Zewi from Technion, Kshipra Bhavalkar from Stanford and Sudeepa Roy from University of Pennsylvania. Julia invited and hosted the three students for two week at the end of July/ early August 2009. (See “Women Mentoring Women” section of page 10.)



Xinyu Feng

Research Assistant Professor

www.ttic.edu/feng

Published/Submitted Papers

“Weak Updates and Separation Logic.” Gang Tan, Zhong Shao, Xinyu Feng and Hongxu Cai. In Proc. of 7th Asian Symposium on Programming Languages and System (APLAS 2009), pages 178-193, 2009.

“Parameterized Memory Models and Concurrent Separation Logic.” Rodrigo Ferreira Xinyu Feng and Zhong Shao. In Proc. of 19th European Symposium on Programming (ESOP 2010), pages 267-286, 2010.

“Reasoning about Optimistic Concurrency Using a Program Logic for History.” Ming Fu, Yong Li, Xinyu Feng, Zhong Shao and Yu Zhang. In Proc. of 21st International Conference on Concurrency Theory (CONCUR 2010), to appear, 2010.



Lance Fortnow

Adjunct Professor

Published/Submitted Papers

“Derandomizing from random strings.” H. Buhrman, L. Fortnow, M. Koucky, and B. Loff. In Proceedings of the 25th IEEE Conference on Computational Complexity, pages 58-63. IEEE, 2010.

“Bounding rationality by discounting time.” Fortnow and R. Santhanam. In Proceedings of The First Symposium on Innovations in Computer Science. Tsinghua University Press, Beijing, 2010.

“Inseparability and strong hypotheses for disjoint NP pairs.” L. Fortnow, J. Lutz, and E. Mayordomo. In Jean-Yves Marion and Thomas Schwentick, editors, Proceedings of the 27th Symposium on Theoretical Aspects of Computer Science, volume 5 of Leibniz International Proceedings in Informatics (LIPIcs), pages 395-404. Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik, Dagstuhl, Germany, 2010.

“A computational theory of awareness and decision making.” N. Devanur and L. Fortnow. In Proceedings of the 12th Conference on Theoretical Aspects of Rationality and Knowledge, pages 99-107. ACM, 2009.

“Program equilibria and discounted computation time.” L. Fortnow. In Proceedings of the 12th Conference on Theoretical Aspects of Rationality and Knowledge, pages 128-133. ACM, 2009.

“Inverting onto functions and the polynomial hierarchy.” H. Buhrman, L. Fortnow, M. Koucky, J. Rogers, and N. Vereshchagin. Theory of Computing Systems, 46(1):143-156, January 2010.

“Gaming prediction markets: Equilibrium strategies with a market maker.” Y. Chen, S. Dimitrov, R. Sami, D. Reeves, D. Pennock, R. Hanson, L. Fortnow, and R. Gonen. Algorithmica, 2009.

“A simple proof of Toda’s theorem.” L. Fortnow. Theory of Computing, 5(7):135-140, 2009.

Talks

Distinguished Lecturer, University of Alberta, January 2010

Keynote Speaker, Logical Approaches to Barriers in Computing and Complexity, Greifswald, Germany, February 2010

Invited Speaker, Combinatorics, Groups, Algorithms, and Complexity Conference in honor of Laci Babai’s 60th Birthday, March 2010

Department Seminar, Penn State, February 2010

Involvement

SIGACT Chair

CRA Computing Consortium Committee Council

Editor-in-Chief, ACM Transactions on Computation Theory

Various reviewing and grant panels

Research Funding Awards

National Science Foundation grant 0829754 titled “Instance Compression”, \$300,000 for 3 years, Dr. Fortnow is the Principal Investigator.

Miscellaneous

“The status of the P versus NP problem.” L. Fortnow. Communications of the ACM, 52(9):78-86, September 2009. Review Article.

“Time for computer science to grow up.” L. Fortnow. Communications of the ACM, 52(8):33-35, August 2009. Viewpoint Column.



Tamir Hazan

Research Assistant Professor
www.ttic.edu/tamir

Published/Submitted Papers

“Direct Loss Minimization for Structured Prediction.” David McAllester, Tamir Hazan and Joseph Keshet. In submission to NIPS 2010.

“A Primal-Dual Message-Passing Algorithm for Approximated Large Scale Structured Prediction.” Tamir Hazan and Raquel Urtasun. In submission to NIPS 2010.

“Norm-Product Belief Propagation: Primal-Dual Message-Passing for Approximate Inference.” Tamir Hazan and Amnon Shashua. Accepted IEEE Information Theory.

Talks

“Approximate inference and approximate learning” DAGS Seminar, Stanford University.

“Approximated Structured-Prediction” PRiML Seminar, University of Pennsylvania.

Involvement

Journal of the International Measurement Confederation, IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), International Conference of Machine Learning (IMCL), Uncertainty in Artificial Intelligence (UAI), Neural Information Processing Systems (NIPS)

Miscellaneous

Technical Report: “Approximated Structured Prediction for Large Scale Graphical Models.” Tamir Hazan and Raquel Urtasun.



Joseph Keshet

Research Assistant Professor
www.ttic.edu/keshet

Published/Submitted Papers

“Automatic Discriminative Measurement of Voice Onset Time.” Sonderegger and Keshet. Interspeech 2010.

“Direct Loss Minimization for Structured Prediction.” McAllester, Hazan and Keshet. Submitted to NIPS 2010.

“Explicit Approximations of the Gaussian Kernel.” Keshet, Cotter and Srebro. Submitted to NIPS 2010.

Talks

“Discriminative Spoken Keyword Detection” EESIP Seminar, Columbia University, December 2009.

“Discriminative Spoken Keyword Detection” Fondazione Bruno Kessler (FBK) and Trento University, Trento, Italy, December 2009.

“Direct Loss Minimization for Forced Alignment” Illinois Speech Day, TTIC, May 2010.

Involvement

Reviewer: JMLR, Pattern Recognition, Pattern Recognition Letters, Speech Communication, IEEE Trans. on Speech and Audio Processing, IEEE Journal of Selected Topics in Signal Processing, EURASIP Journal on Audio, Speech, and Music Processing.

Classes/Seminars

Speech Recognition reading group, TTIC- Weekly seminars involving: discussing papers from the field of speech and language processing and recognition; people presenting their research; people presenting papers or topics; host talks by visitors

Structured Prediction reading group, TTIC- Weekly seminars involving: discussing papers from the field of structured prediction and machine learning; people presenting their research; people presenting papers or topics; host talks by visitors

Topics in Artificial Intelligence: Speech Technologies (TTI CMSC 35900): Assisted Professor Karen Livescu.



Karen Livescu

Assistant Professor
www.ttic.edu/livescu

Published/Submitted Papers

“Multi-view learning of acoustic features for speaker recognition.” K. Livescu and M. Stoehr. ASRU, Dec. 2009.

“Semi-supervised domain adaptation for automatic dialog act tagging.” A. Margolis, K. Livescu, and M. Ostendorf. DANLP, July 2010.

“Cross-genre training for automatic prosody classification.” A. Margolis, M. Ostendorf, and K. Livescu. Speech Prosody, May 2010.

“Multistream articulatory feature-based models for visual speech recognition.” K. Saenko, K. Livescu, J. Glass, and T. Darrell, IEEE Trans. Pattern Analysis and Machine Intelligence 31(9):1700-1707, September 2009.

Talks

“Multi-view learning of speech feature spaces”, DSP Seminar, U. Illinois at Urbana-Champaign.

“Multi-view learning of speech feature spaces”, Machine Intelligence group, Cambridge University.

Involvement

Subject editor: Speech Communication journal.

Organizing committee member: Speech Prosody conference, Chicago, May 11-14, 2010.

Main organizer: Illinois Speech Day, TTIC, May 10, 2010.

Research Funding Awards

NSF grant, “Explicit Articulatory Models of Spoken Language, with Application to Automatic Speech Recognition,” \$438,830, July 2009 - June 2012. Dr. Livescu is Principal Investigator. (Collaborative grant with Jeff Bilmes at U. Washington and Eric Fosler-Lussier at Ohio State U.)

Classes/Seminars

Topics in Artificial Intelligence: Speech Technologies, CMSC 35900: The course introduces techniques used in speech technologies, mainly focusing on speech recognition. Sample topics: Feature extraction, phonetic classification, acoustic modeling with hidden Markov models, pronunciation modeling, language modeling, expectation-maximization for learning, large-vocabulary recognition, discriminative models, graphical models.

Participated in teaching TTI (Nagoya, Japan) machine learning video conference course.



Yury Makarychev

Assistant Professor
www.ttic.edu/makarychev

Published/Submitted Papers

“Metric Extension Operators, Vertex Sparsifiers and Lipschitz Extendability.” Konstantin Makarychev and Yury Makarychev. FOCS 2010, to appear (accepted).

“Subgraph Sparsification and Nearly Optimal Ultrasparifiers.” Alexandra Kolla, Yury Makarychev, Amin Saberi, and Shang-Hua Teng. STOC 2010, pp. 57-65. Oral presentation. June 2010.

“Local Global Tradeoffs in Metric Embeddings.” Moses Charikar, Konstantin Makarychev and Yury Makarychev. SIAM J.Comput. (SICOMP), vol. 39, no. 6, pp. 2487-2512, 2010 (special issue).

“Near-Optimal Algorithms for Maximum Constraint Satisfaction Problems.” Moses Charikar, Konstantin Makarychev and Yury Makarychev. ACM Trans. Alg., vol. 5, no. 3, July 2009 (special issue).

Talks

“How to Play Unique Games on Expanders,” INFORMS Annual Meeting, session on Geometric Methods in Algorithms and Optimization, San Diego, CA, October 2009.

“Subgraph Sparsification and Nearly Optimal Ultrasparifiers” Department of Computer Science, University of Illinois at Chicago (UIC), Chicago, IL, March 2010.

“Subgraph Sparsification and Nearly Optimal Ultrasparifiers.” IBM Research T.J. Watson, Yorktown Heights, NY. Integer Programming Seminar, March 2010.

Involvement

Reviewed papers for: STOC 2010, FOCS 2010, SODA 2010, APPROX 2010, Computational Complexity.

Organized a session on approximation algorithms at INFORMS Annual Meeting in San Diego, CA.

Classes/Seminars

Taught a Reading and Research class (independent study) at the Dept. of Computer Science, University of Chicago (Fall 2009).

Miscellaneous

“Programming Czar” at TTIC for 2009-10, reviewing PhD students’ programming projects to fulfill the programming requirement for the PhD program.



David McAllester

Professor, Chief Academic Officer

www.ttic.edu/mcallester

Published/Submitted Papers

“Cascade Object Detection with Deformable Part Models.” P. Felzenszwalb, R. Girshick, D. McAllester. CVPR, June 2010.

“Unsupervised Learning of Stereo Vision with Monocular Cues.” Hoang Trinh, David McAllester. BMVC, September 2009.

“Structure and Motion from Road-Driving Stereo Sequences.” Hoang Trinh and David McAllester. IEEE Workshop on 3D Information Extraction for Video Analysis and Mining - CVPR, June 2010.

“Stereovision-based road boundary detection for intelligent vehicles in challenging scenarios.” Chunzhao Guo, Seiichi Mita, David A. McAllester. IROS, October 2009.

Talks

Keynote talk at the Snowbird Learning Conference, “Object Detection Grammars” April 2010.

“Frequents vs. Bayesians, the PAC-Bayesian synthesis, and support vector machines” Google machine learning lecture series, University of Waterloo, May 2010.

“Direct Loss Minimization” Invited Talk, NIPS Workshop on Approximate Learning of Large Scale Graphical Models: Theory and Applications.

Involvement

Reviewed for CVPR 2009 and ICML 2010.

Recognition

First place in the PASCAL object detection challenge, with Pedro Felzenszwalb and Ross Girshick, October 2009.

AAAI Classic paper Award for “Systematic Nonlinear Planning” with David Rosenblitt which appeared in AAAI 1991. Awarded July 2010.

Classes/Seminars

Introduction to Machine Learning I, CMSC 35420-1, Autumn 2009: This course gives a survey of mathematical methods in statistical modeling, inference, and learning with an emphasis on techniques widely used in speech recognition, computational linguistics and vision. Each lecture is organized around a theorem, algorithm, or technical concept.

TTIC 106: Symbolic Computation, Winter 2010: This course covers symbolic computation widely construed. It is divided into four parts. The first part covers the general concept of inference rules. This includes the a general formulation of expressions, variables, and substitutions, inference rules as a model of computation, inference rules as a general expression of dynamic programming algorithms, and general concepts of semantics, soundness and completeness. The second part of the course covers type theory and various forms of typed lambda calculus viewed as programming languages. The third part of the course develops a classical (nonconstructive) foundation of mathematics as an extension of the typed lambda calculus. (There is no mention of the Curry-Howard isomorphism — formulas are formulas and types are types.) A large emphasis is placed on existential types as a way of understanding abstraction in classical mathematics. A full abstraction theorem is proved stating that two (typed) objects are observationally equivalent if and only if they are isomorphic. Parametricity is also developed with the primary example being the non-existence of a natural isomorphism between a vector space and its dual. The final part of the course consists of studying type-theoretic abstraction in the context of machine learning. Topics include type-theoretic abstraction as related to gradient descent, PCA, CCA, SVMs, dual norms, measure theory, and information geometry.



Devi Parikh

Research Assistant Professor
www.ttic.edu/parikh

Published/Submitted Papers

“The Role of Features, Algorithms and Data in Visual Recognition.” D. Parikh, L. Zitnick. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2010 (poster).

“MRF Inference via Outer-Planar Decomposition.” D. Batra, A. Gallagher, D. Parikh, T. Chen. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2010 (poster).

“iCoseg: Interactive Co-segmentation with Intelligent Scribble Guidance.” D. Batra, A. Kowdle, D. Parikh, J. Luo, T. Chen. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2010 (poster).

Talks

“The Role of Context in Image Understanding; When, For What and How?” College of Computing, Georgia Tech, April 2010.

Involvement

Organized workshop on Advancing Computer Vision with Humans in the Loop (ACVHL) in conjunction with CVPR 2010 (Co-organizers: Andrew Gallagher and Tsuhan Chen)

Reviewed papers for conferences: CVPR 2010, ECCV 2010, ICIP 2010

Reviewed papers for journals: TPAMI (Transactions on Pattern Analysis and Machine Intelligence), TIP (IEEE Transactions on Image Processing), T-SP (IEEE Transactions on Image Processing), Neurocomputing

Classes/Seminars

Taught two lectures in Spring 201035040/25040 : Introduction to Computer Vision on Recognition; classification and Recognition; Parts-based models
Organize the Computer Vision Reading group at TTIC: A weekly discussion group dedicated to topics related to computational vision and vision science; a mix of papers, brainstorming, and guest speakers.



Nathan Ratliff

Research Assistant Professor
www.ttic.edu/ratliff

Talks

“Planning-based Prediction for Pedestrians” IROS 2009, October 2009.

“Structured prediction techniques for imitation learning” Research at TTIC Seminar Series, October 2009.

Involvement

Program Committee: NIPS 2010, AAAI 2010.

Reviewer: IROS 2010.

Miscellaneous

Constructed a mobile robot for the TTIC Robotics Lab.



Alexander Razborov

Professor, Part Time

<http://people.cs.uchicago.edu/~razborov>

Published/Submitted Papers

“Almost Euclidean subspaces of ℓ_1^N via expander codes.” Alexander A. Razborov, Venkatesan Guruswami and James Lee, in *Combinatorica*, Vol. 30, No 1, 2010, pages 47-68.

“The Sign-Rank of AC^0 .” Alexander A. Razborov and Alexander Sherstov, in *SIAM Journal on Computing*, Vol. 39, No 5, 2010, pages 1833-1855.

“On 3-hypergraphs with forbidden 4-vertex configurations.” Alexander A. Razborov. *SIAM Journal on Discrete Mathematics*. Accepted.

“Diameter of Polyhedra: Limits of Abstraction.” (*Mathematics of Operations Research*), Alexander A. Razborov, Friedrich Eisenbrand, Nicolai Hahnle and Thomas Rothvoss. Submitted.

Talks

Opening Lecture for the 5th International Computer Science Symposium in Russia, Kazan, June 2010, “Complexity of Propositional Proofs”.
21st Annual Gödel Lecture, Association for Symbolic Logic North American Annual Meeting, Washington DC, March 2010, “Complexity of propositional proofs”.

“Flag Algebras” University of Illinois Chicago, February 2010

“A Product Theorem in Free Groups” Ohio State University, March 2010

“Upper Bounds on the Threshold Quantum Decoherence Rate” Kazan State University, June 2010

Involvement

Editorial Boards of the journals “Izvestiya of the Russian Academy of Sci., ser. mathem.”; “Combinatorica”; “Computational Complexity”; “Combinatorics, Probability and Computing”.

Serves on numerous other committees.

Classes/Seminars

CMSC 27100-1: Discrete Mathematics (Autumn 2009); We emphasize mathematical discovery and rigorous proof, which are illustrated on a refreshing variety of accessible and useful topics. Basic counting is a recurring theme and provides the most important source for sequences, which is another recurring theme. Further topics include proof by induction; recurrences and Fibonacci numbers; graph theory and trees; number theory, congruences, and Fermat’s little theorem; counting, factorials, and binomial coefficients; combinatorial probability; random variables, expected value, and variance; and limits of sequences, asymptotic equality, and rates of growth.

CMSC 38500-1: Computability and Complexity Theory (Winter 2009); Part one consists of models for defining computable functions: primitive recursive functions, (general) recursive functions, and Turing machines; the Church-Turing Thesis; unsolvable problems; diagonalization; and properties of computably enumerable sets. Part two deals with Kolmogorov (resource bounded) complexity: the quantity of information in individual objects. Part three covers functions computable with time and space bounds of the Turing machine: polynomial time computability, the classes P and NP, NP-complete problems, polynomial time hierarchy, and P-space complete problems.

CMSC 38700-1: Complexity Theory B (Spring 2010); Topics are covered in computational complexity theory with an emphasis on combinatorial problems in complexity.



Greg Shakhnarovich

Assistant Professor
www.ttic.edu/shakhnarovich

Published/Submitted Papers

“Sparse Coding for Learning Interpretable Spatio-temporal Primitives.” T. Kim, R. Urtasun, G. Shakhnarovich. Submitted to NIPS 2010.
“Reach to grasp actions in rhesus macaques: dimensionality reduction of hand, wrist, and upper arm motor subspaces using principal component analysis.” C.E. Vargas-Irwin, L. Franquemont, G. Shakhnarovich, P. Yadollahpour, M.J. Black, J.P. Donoghue, to appear at Society for Neurosciences Annual Meeting 2010 (poster).
“Decoding complete reach and grasp actions from local primary motor cortex populations.” by C. Vargas-Irwin, G. Shakhnarovich, P. Yadollahpour, J. Mislow, M. J. Black, and J. P. Donoghue. Accepted to Journal of Neuroscience, 2010.

Talks

“Supervised Learning of Similarity” University of Chicago, Theory Seminar

Involvement

Reviewing for conferences: ECCV, ICCV, CVPR, NIPS, AISTats

Reviewing for journals: IEEE TPAMI, IJCV

Classes/Seminars

CMSC 35040/25040 (Spring 2010): Introduction to Computer Vision. This class covers an introduction to fundamental methods in machine vision and image processing.



Anastasios Sidiropoulos

Research Assistant Professor
www.ttic.edu/sidiropoulos

Published/Submitted Papers

“Genus and the geometry of the cut graph.” James R. Lee, Anastasios Sidiropoulos. 21st ACM-SIAM Symposium on Discrete Algorithms (SODA 2010).
“Inapproximability for planar embedding problems.” Jeff Edmonds, Anastasios Sidiropoulos, Anastasios Zouzias. 21st ACM-SIAM Symposium on Discrete Algorithms (SODA 2010).

Talks

Invited talk at INRORMS 2009, San Diego, CA.

Invited talk at the Illinois Institute of Technology.

Invited talk at the University of Chicago.

Invited talk at EHT, Zurich.

Invited talk at TAMC 2010, Prague.

Involvement

Reviewer for SODA 2010, STOC 2010, FOCS 2010, APPROX 2010, Theoretical Computer Science.



Nathan Srebro

Assistant Professor, Director of Graduate Studies
www.ttic.edu/srebro

Published/Submitted Papers

“On the Interaction between Norm and Dimensionality: Multiple Regimes in Learning.” Percy Liang and Nathan Srebro. 27th International Conference on Machine Learning (ICML), June 2010.

“Reducing Label Complexity by Learning from Bags.” Sivan Sabato, Nathan Srebro, Naftali Tishby. 13th International Conference on Artificial Intelligence and Statistics (AISTATS), May 2010.

“Statistical Analysis of Semi-Supervised Learning: The Limit of Infinite Unlabelled Data.” Boaz Nadler, Nathan Srebro, Xueyuan Zhou. Advances in Neural Information Processing Systems (NIPS) 22, 2010 (December 2009 conference).

“Pegasos: Primal Estimated sub-GrAdient SOLver for SVM.” Shai Shalev-Shwartz, Yoram Singer, Nathan Srebro, Andrew Cotter. Mathematical Programming B.

“Trading Accuracy for Sparsity in Optimization Problems with Sparsity Constraints.” Shai Shalev-Shwartz, Nathan Srebro, Tong Zhang. SIAM Journal on Optimization.

Talks

Tutorial on: “Stochastic Optimization for Machine Learning” 27th International Conference on Machine Learning (ICML), June 2010.

Invited talk at NIPS workshop on Optimization for Machine Learning

Talk at California Institute of Technology

Talk at Toyota Technological Institute (Nagoya)

Talk at University of Chicago

Talk at Hebrew University

Talk at Technion-Israel Institute of Technology

Talk at the TTIC/UChicago Machine Learning Summer School

Involvement

JMLR Editorial Board

AISTATS Senior Program Committee Member

Area Chair: ICML, NIPS

Review for: COLT, FOCS, STOC, JMLR, Mathematical Programming, Journal of the ACM

Classes/Seminars

CompView Fall School on Machine Learning, Tokyo Institute of Technology

Convex Optimization, Weizmann Institute of Science

Optimization CMSC 34500 (Spring 2010): The course covers techniques in unconstrained and constrained convex optimization and a practical introduction to convex duality. The course will focus on (1) formulating and understanding convex optimization problems and studying their properties; (2) presenting and understanding optimization approaches; and (3) understanding the dual problem. Limited theoretical analysis of convergence properties of methods will be presented. Examples will be mostly from data fitting, statistics and machine learning.

Several lectures for Machine Learning class at TTIC and at TTIJ

Miscellaneous

Director of Graduate Studies



Ambuj Tewari

Research Assistant Professor

www.ttic.edu/tewari

Published/Submitted Papers

“Convex games in Banach spaces.” Karthik Sridharan and Ambuj Tewari. In Proceedings of the 23rd Annual Conference on Learning Theory, 2010.

“Composite objective mirror descent.” John Duchi, Shai Shalev-Shwartz, Yoram Singer, and Ambuj Tewari. In Proceedings of the 23rd Annual Conference on Learning Theory, 2010.

“Learning exponential families in high-dimensions: Strong convexity and sparsity.” Sham M. Kakade, Ohad Shamir, Karthik Sridharan, and Ambuj Tewari. In Proceedings of the 13th International Conference on Artificial Intelligence and Statistics, volume 9 of JMLR Workshop and Conference Proceedings, pages 381-388, May 2010.

Talks

“Strong convexity and strong smoothness: Applications to learning with matrices” Invited talk at an INFORMS 2009 session, October 2009

“Risk, Regularization and Regret: A View through the Lens of Strong Convexity” IBM TJ Watson, April 2010

“Risk, Regularization and Regret: A View through the Lens of Strong Convexity” Google Research Mountain View, April 2010

“Risk, Regularization and Regret: A View through the Lens of Strong Convexity” Microsoft Research, May 2010

“Risk, Regularization and Regret: A View through the Lens of Strong Convexity” University College London, May 2010

Involvement

Program Committee member: COLT 2010

Journals: JMLR

Conferences: ICML 2010, AISTATS 2010, COLT 2010

Classes/Seminars

Co-organized TTIC’s Structured Prediction reading group with Joseph Keshet. Included weekly seminars involving: discussing papers from the field of structured prediction and machine learning; people presenting their research; people presenting papers or topics; host talks by visitors



Raquel Urtasun

Assistant Professor
www.ttic.edu/urtasun

Published/Submitted Papers

- “Learning to Recognize Objects from Unseen Modalities.” C. M. Christoudias, R. Urtasun, M. Salzmann and T. Darrell. In European Conference in Computer Vision (ECCV) Crete, September 2010.
- “Combining Discriminative and Generative Methods for 3D Deformable Surface and Articulated Pose Reconstruction.” M. Salzmann and R. Urtasun. In Conference in Computer Vision and Pattern Recognition (CVPR) San Francisco, June 2010. (oral presentation)
- “Sufficient Dimensionality Reduction for Visual Sequence Classification.” A. Shyr, R. Urtasun and M. I. Jordan. In Conference in Computer Vision and Pattern Recognition (CVPR) San Francisco, June 2010.
- “Factorized Orthogonal Latent Spaces.” M. Salzmann, C. Ek, R. Urtasun and T. Darrell. In International Conference on Artificial Intelligence and Statistics (AI Stats) Sardinia, Italy, May 2010.
- “FOLS: Factorized Orthogonal Latent Spaces.” M. Salzmann, C. H. Ek, R. Urtasun and T. Darrell. In Learning Workshop Snowbird. Snowbird, Utah, April 2010. (oral presentation)
- “A Constrained Combination of Discriminative and Generative Methods.” M. Salzmann and R. Urtasun, In Learning Workshop Snowbird. Snowbird, Utah, April 2010.
- “Bayesian Localized Multiple Kernel Learning.” C. M. Christoudias, R. Urtasun and T. Darrell. In Learning from Multiple Sources with Applications to Robotics Workshop at NIPS. Whistler, Canada, December 2009.
- “Gaussian Processes for Object Categorization.” A. Kapoor, K. Graumann, R. Urtasun, T. Darrell. Accepted to Appear in International Journal in Computer Vision, (IJCV) 2010.

Talks

- “Non-parametric models for the analysis of human behavior” ETHZ Computer Science Colloquium, Zurich, Switzerland, April 2010.
- “Non-parametric models for the analysis of human behavior” Max Planck Institute, Tübingen, Germany, April 2010.
- “Non-parametric models for the analysis of human behavior” PIXAR animation studios, August 2009.

Involvement

Program committee: ICCV09, CVPR10, NIPS09, ICML10, AISTATS10, IJCAI09
Reviewer: PAMI, IJCV, JMLR, Siggraph, etc.

Recognition

Dr. Urtasun’s co-student, Andreas Geiger, won the “Best dissertation proposal award” at the IEEE Intelligent Vehicles Symposium 2010.



Jinbo Xu

Assistant Professor

www.ttic.edu/xu

Published/Submitted Papers

“Low-homology Protein Threading.” Jian Peng and Jinbo Xu. ISMB 2010 (also appears in Bioinformatics).

“Fragment-free Approach to Protein Folding Using Conditional Neural Fields.” Feng Zhao, Jian Peng and Jinbo Xu. ISMB 2010 (also appears in Bioinformatics).

“Conditional Neural Fields.” Jian Peng, Liefeng Bo and Jinbo Xu. Proceedings of NIPS, November 2009.

“Struct2Net: a Web-Service to Predict Protein-Protein Interactions Using a Structure-based Approach.” Rohit Singh, Daniel Park, Jinbo Xu, Raghavendra Hosur and Bonnie Berger. NAR web server issue. (The first three authors equally contribute to this paper.)

“Protein Structure Prediction Enhanced with Evolutionary Diversity: SPEED.” Joe DeBartolo, Glen Hocky, Mike Wilde, Jinbo Xu, Karl F. Freed and Tobin R. Sosnick. Protein Science, 2009.

“A probabilistic and continuous model of protein conformational space for template-free modeling.” Feng Zhao, Jian Peng, Joe DeBartolo, Karl F. Freed, Tobin R. Sosnick and Jinbo Xu. Journal of Computational Biology, 2009. An early version of this paper also appears at RECOMB 2009. In Press.

Talks

“Probabilistic Graphical Models for Protein Modeling” Department of Computer Science, Dartmouth College, April 2010.

“Optimization Techniques for Protein Structure Prediction.” Department of Mathematics, Illinois Institute of Technology, March 2010.

“Discriminative learning for protein conformation sampling.” OSG All Hands Meeting, Fermilab in Batavia, Illinois, March 2010.

Involvement

Program Committee member: IEEE BIBM 2010, ICMLA 2010, BIODDD 2010, ISMB 2010, RECOMB 2010, IBW 2010.

Panelists for: NIH MSFD study section, NIH BMB special emphasis study section and Israel Science Foundation.

Reviewer for the following journals and conferences: Bioinformatics, BMC Bioinformatics, Journal of Computational Biology, Mathematical Biosciences, IEEE/ACM TCBB, Proteins and Proteome.

Classes/Seminars

Topics in Bioinformatics and Computational Biology (Autumn 2009): This course focuses on the application of mathematical models and computer algorithms to the problems in the field of molecular biology. In particular, this course consists of two major components. The first component will cover some fundamental computational approaches to biological sequence analysis including pairwise/multiple sequence alignment, homology search and sequence motif discovery. The second component will cover computational approaches to protein/RNA structural bioinformatics including structure comparison, structure prediction and function prediction. If we have more time, we will also touch other topics such as biological network analysis.

Recognition

Dr. Xu’s graduate student, Jian Peng, was awarded the prestigious Microsoft Research PhD Fellowship 2010.

Research Funding Awards

Jinbo Xu. NIH/NIGMS 1R01GM089753. New Computational Methods for Data-Driven Protein Structure Prediction. May 2010- April 2015. Direct cost \$195k/year, total cost \$270k/year.

Tobin Sosnick (PI), Jinbo Xu and Karl Freed. NIH/NIGMS 1R01GM081642-01, Protein structure refinement using novel move set. August 2007 - July 2010. Direct cost \$48,100/year.

Bonnie Berger (PI), Jinbo Xu and Jadwiga Bienkowska. NIH/NIGMS R01GM081871-01A1, Structure-based Prediction of Protein Interactome. January 2008 - December 2011. Direct cost \$22k/year



Responsibility to the Community

Being a non-profit organization, TTIC maintains an interest in the support of other non-profit organizations. As a young and determined institute, we are doing our best to lay a strong foundation in areas and communities that need stability, and we are pleased to support other organizations that are doing their best to help lay strong roots as well.

This year, TTIC held a shoe drive for an organization named Soles4Souls. Soles4Souls is a Nashville-based charity that collects shoes from the warehouses of footwear companies and personal donations. The charity distributes the shoes free of charge to people in need, regardless of race, religion, class, or any other criteria. Since 2005, Soles4Souls has given away over 10 million pairs of new and gently worn shoes (currently donating one pair every 9 seconds.) The shoes have been distributed to people in over 125 countries, including Kenya, Thailand, Nepal and the United States. TTIC was able to collect sixty-eight pairs of shoes and donate them to the organization.

What is becoming a TTIC tradition, the Institute held a monetary collection for the Hyde Park Kenwood Hunger Program, the local division of the Greater Chicago Food Depository. Institute employees donated \$195 and TTIC matched with \$195 for a total donation to the CGFD of \$390. The Hyde Park Kenwood Hunger Program runs a community food pantry and soup kitchen. Due to the recent tight economy, the program has reported an increase in community need, and a decrease in federal support. TTIC is pleased to be able to lend some support to this local service.

In 2009, TTIC reached the point where actual Ph.D. diploma certificate paper was to be chosen so a student could be presented with the first ever TTIC Ph.D. diploma. It was determined that paper should represent the Institute, the times, and the dignified effort that each student makes on their academic journey to earning the degree. TTIC chose a paper by Glama Natural, North America's leading line of "naturally translucent" papers. The entire line of Glama Natural is Forest Stewardship Council certified to be made with fibers from well managed forests. The particular paper we chose has the eco-features: acid free, elemental chlorine free, FSC certified, lignin free, recyclable, and 30% PCW. The paper was purchased through The Paper Mill Store, which is a proudly uses 100% wind power- a renewable energy source certified by Green-e, and they are recognized as a Partner in the Environmental Protection Agency's (EPA) Green Power Partnership and Green Power Leadership Club.

TTIC is confident that this paper represents the positive initiative to improve the future of the planet for everyone, just as the institute has confidence that the TTIC graduates who receive the diplomas will improve the quality of the computer science research yet to come.



Responsibility to Health

There is never a bad time to pursue a healthy lifestyle, and TTIC saw an opportunity to assist its faculty, students and staff reach better health this year. Since TTIC moved to its new facility, it continues to grow; however there are still a couple offices that remain unoccupied. The Institute has installed fitness equipment in these open offices, and TTIC ID holders may use these at their leisure. In one room there is a Life Fitness T3 Advanced treadmill, with customizable workout settings, adjustable incline, and heart rate sensors. In the second free room there is now a Diamondback recumbent exercise bike. The bike has ergonomic seating, an advanced console, pulse sensors in the handgrips, 16 resistance levels, and a plug for your iPod.

Being healthy is a decision that individuals must make every day, and it is the hope of the Institute that having the health equipment on hand may make it just a little easier, and more convenient for those interested to be able to take a little time to focus on their physical fitness.

5- FINANCIAL REPORTS

Toyota Technological Institute at Chicago
Statements of Financial Position
June 30, 2010 and 2009

	2010	2009
Assets		
Cash and cash equivalents, unrestricted	\$ 1,610,967	\$ 825,695
Cash and cash equivalents, restricted	128,311	148,024
Grants receivable	71,607	67,455
Due from TTI	11,902	-
Prepaid expenses and other current assets	39,656	41,434
Interest receivable	1,114,841	1,156,141
Furniture and equipment, net	1,097,964	1,005,925
Investments, U.S. Treasury notes and TMCC notes	108,794,115	108,657,879
Contributions receivable from TMC	11,647,077	11,498,805
Other assets	-	3,258
	<hr/>	<hr/>
Total assets	\$ 124,516,440	\$ 123,404,616
	<hr/>	<hr/>
Liabilities and Net Assets		
Liabilities		
Accounts payable	\$ 136,882	\$ 141,977
Due to TTI	161,137	21,621
Due to University of Chicago	62,490	5,254
Accrued expenses	191,336	127,445
Deferred revenue	42,163	130,163
Accrued lease liability	124,494	38,081
	<hr/>	<hr/>
Total liabilities	718,502	464,541
	<hr/>	<hr/>
Net assets		
Unrestricted	14,013,361	15,102,207
Temporarily restricted	1,083,253	1,063,868
Permanently restricted	108,701,324	106,774,000
	<hr/>	<hr/>
Total net assets	123,797,938	122,940,075
	<hr/>	<hr/>
Total liabilities and net assets	\$ 124,516,440	\$ 123,404,616
	<hr/>	<hr/>

Toyota Technological Institute at Chicago
Statements of Activities and Changes in Net Assets
Years Ended June 30, 2010 and 2009

	2009/2010			2008/2009				
	Unrestricted	Temporarily Restricted	Permanently Restricted	Total	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Revenues and gains								
Contributions	\$ -	\$ -	\$ 148,273	\$ 148,273	\$ 4,415,448	\$ -	\$ 74,829,749	\$ 79,245,197
Tuition and fees	378,934	-	-	378,934	355,211	-	-	355,211
Less scholarships	(346,608)	-	-	(346,608)	(323,216)	-	-	(323,216)
Net tuition and fees	32,326	-	-	32,326	31,995	-	-	31,995
Grants	560,757	-	-	560,757	253,847	-	-	253,847
Interest income on investments	4,374,485	-	-	4,374,485	2,018,949	-	-	2,018,949
Other interest income	3,954	-	-	3,954	49,899	-	-	49,899
Total revenues	4,971,522	-	148,273	5,119,795	6,770,138	-	74,829,749	81,599,887
Net unrealized and realized gains on investments	-	19,385	1,779,051	1,798,436	67,175	-	941,669	1,008,844
Other gains/Income	-	-	-	-	14,770	-	-	14,770
Total revenues and gains	4,971,522	19,385	1,927,324	6,918,231	6,852,083	-	75,771,418	82,623,501
Expenses								
Education and research	4,549,482	-	-	4,549,482	4,072,850	-	-	4,072,850
Management and general	1,406,771	-	-	1,406,771	1,308,389	-	-	1,308,389
Total expenses	5,956,253	-	-	5,956,253	5,381,239	-	-	5,381,239
Net realized and unrealized losses on investments	104,115	-	-	104,115	-	149,473	-	149,473
Total expenses and losses	6,060,368	-	-	6,060,368	5,381,239	149,473	-	5,530,712
Reclassification	-	-	-	-	12,254,573	(12,254,573)	-	-
Change in net assets	(1,088,846)	19,385	1,927,324	857,863	13,725,417	(12,404,046)	75,771,418	77,092,789
Net assets								
Beginning of year	15,102,207	1,063,868	106,774,000	122,940,075	1,376,790	13,467,914	31,002,582	45,847,286
End of year	\$ 14,013,361	\$ 1,083,253	\$ 108,701,324	\$ 123,797,938	\$ 15,102,207	\$ 1,063,868	\$ 106,774,000	\$ 122,940,075

6- GOVERNANCE

Board of Trustees



Tatsuro Toyoda, *Chairman of the Board of Trustees*

Senior Advisor, Toyota Motor Corporation
Former President and Vice Chairman, Toyota Motor Corporation
Former Chairman, Japan Automobile Manufacturers Association
Former President, NUMMI



Mitsuru Nagasawa, *President, Toyota Technological Institute at Chicago; President Emeritus, TTI*

Postdoctoral Research Associate, University of Chicago, 1959-1961 (Fulbright Program)
President Emeritus, Toyota Technological Institute, Nagoya Japan
Professor Emeritus & Former Dean of Faculty of Engineering, Nagoya University



Rita Colwell, *Chairman, Canon US Life Sciences, Inc. Distinguished Professor, University of Maryland College Park and Johns Hopkins University*

11th Director of the National Science Foundation, 1998-2004.
Authored or co-authored 16 books and more than 700 scientific publications.
A geological site in Antarctica, Colwell Massif, has been named in recognition of her work in the polar regions.



Dennis C. Cuneo, *Attorney and Partner, Arent Fox PLLC*

Former Senior Vice President, Toyota Motor North America, Inc.
Chairman, Cincinnati Branch of the Federal Reserve
Appointed by the Chief Justice, CA Supreme Court, to the Select Committee on Judicial Retirement



Robert A. Fefferman, *Dean and Max Mason Distinguished Service Professor, Division of the Physical Sciences, University of Chicago*

Former Chairman, Department of Mathematics, University of Chicago
Recipient, Quantrell Award for Excellence in Undergraduate Teaching, University of Chicago Sloan Foundation Fellow



Akira J. Ikushima, *President, Toyota Technological Institute*

Board Member: Toyota School Foundation, The Toyota Foundation, Toyota Physical & Chemical Research Institute
Authored or co-authored approximately 300 papers in international journals, and approximately 70 publications in domestic journals.
Former Executive Director, Research Laboratory, HOYA Corporation and Director, Non-Oxide Glass Research Corporation.
Executive committee member of "Tokyo Ultrasonic Symposium" since 1980.



Masanori Kashiwara, *Senior Managing Director, Toyota Technological Institute*

Member of the Board of Directors, Toyota School Foundation
Former Chief Administrative Officer, Toyota Technological Institute
Former Vice President, Toyota Motor North America, Inc.
Former Secretary and Treasurer, Toyota Motor Corporate Services of North America, Inc



Neal Lane, *Malcolm Gillis University Professor, Rice University*

Senior Fellow of the James A. Baker III Institute for Public Policy.
Served as Assistant to the President for Science and Technology and Director of the White House Office of Science and Technology Policy, from August 1998 to January 2001.
Chancellor of the University of Colorado at Colorado Springs, 1984-86.



David W. Oxtoby, *President, Pomona College*

Former Dean, Division of Physical Sciences, University of Chicago
Former member, Argonne National Laboratory, Board of Governors
Trustee, Bryn Mawr College
John Simon Guggenheim Foundation Fellow



Toshiaki Taguchi, *Advisor, Toyota Motor Corporation*

Former President & CEO, Toyota Motor North America, Inc.
Former Executive Vice President, Toyota Motor Corporation
Former Board of Directors of Japan Society, the Japanese Chamber of Commerce and Industry of New York and The Nippon Club



Robert Barnett, *Partner, Williams & Connolly LLP*

Ranked Number One, Washingtonian Magazine's list of "Washington's Best Lawyers."
Executive Committee Member, Williams & Connolly LLP
Senior Counsel, Board of Trustees of the John F. Kennedy Center for the Performing Arts. (President-appointed member.)



Sharon Darling, *President & Founder, National Center for Family Literacy*

Frequent keynote speaker to the Business Week Fortune 500 Forum and the National Governors Association.
Recipient of the National Humanities Medal awarded by President and Mrs. Bush, and the Albert Schweitzer Prize for Humanitarianism, Johns Hopkins University
Serves on the boards of: the Barbara Bush Foundation for Family Literacy, the National Fund for Excellence in American Indian Education, Corporation for Public Broadcasting's Ready to Learn, and the Heart of America Foundation.

Leadership

Dr. Mitsuru Nagasawa, *President*

Mr. Motohisa Noguchi, *Treasurer/ Secretary to the Board*

Dr. Stuart Rice, *Dean*

Dr. David McAllester, *Chief Academic Officer*

Mr. Gary Hamburg, *Chief Administrator*

Administrative Staff Supporting TTIC

Adam Bohlander, *Systems Administrator*

Carole Flemming, *Human Resources Coordinator & Registrar*

Dawn Gardner, *Staff Accountant*

Julia MacGlashan, *Administrative Assistant- Faculty Services*

Chrissy M. Novak, *Assistant Administrator- Publications and Student Services*

Equal Opportunity

TTIC, in admissions, employment and access to programs, considers all faculty, staff and students on the basis of individual merit and without regard to race, color, religion, sex, sexual orientation, national or ethnic origin, age, disability, or any other legally protected status.

Special Thanks

The Toyota Technological Institute at Chicago would like to extend a heartfelt thank you to the many people, organizations and efforts that assisted us through 2009-10, and continue to lend us their assistance, support and services. We appreciate it so very much.

Special thanks to:

The External Advisory Committee

Eric Grimson, Dept. Head of Electrical Engineering and Computer Science, MIT

Takeo Kanade, Director of Robotics, Carnegie Mellon University

Richard Karp, Research Scientist, International Computer Science Institute, University of California, Berkeley.

Eva Tardos, Computer Science Department, Cornell University

The University of Chicago greater community

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University Research Administration

URHM Training Center

NSIT

Dr. Robert Appleson at the Higher Learning Commission

The professionals at the 6045 S. Kenwood Avenue building

Pat Eide, Berland Printing

The Toyota Technological Institute (Nagoya, Japan)





Toyota Technological Institute @ Chicago

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