## Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute Mission</td>
<td>4</td>
</tr>
<tr>
<td>Message from the President</td>
<td>6</td>
</tr>
<tr>
<td>Note from the Chief Academic Officer</td>
<td>8</td>
</tr>
<tr>
<td>Persisting Through a Global Pandemic</td>
<td>10</td>
</tr>
<tr>
<td><strong>Institute Overview</strong></td>
<td></td>
</tr>
<tr>
<td>Awards and Honors</td>
<td>12</td>
</tr>
<tr>
<td>New Faculty</td>
<td>13</td>
</tr>
<tr>
<td>Faculty Promotion and Tenure</td>
<td>14</td>
</tr>
<tr>
<td>Faculty by Area</td>
<td>14</td>
</tr>
<tr>
<td>Post-Docs</td>
<td>15</td>
</tr>
<tr>
<td><strong>Institute Progress</strong></td>
<td></td>
</tr>
<tr>
<td>Newly Renovated Facility</td>
<td>16</td>
</tr>
<tr>
<td>Board Chair Succession</td>
<td>16</td>
</tr>
<tr>
<td>New Award Recognizes Administrative Achievements</td>
<td>18</td>
</tr>
<tr>
<td>Communicating the Story of TTIC</td>
<td>18</td>
</tr>
<tr>
<td>Sponsored Research</td>
<td>19</td>
</tr>
<tr>
<td><strong>Institute Research</strong></td>
<td></td>
</tr>
<tr>
<td>Research Philosophy</td>
<td>20</td>
</tr>
<tr>
<td>Algorithms and Complexity</td>
<td>20</td>
</tr>
<tr>
<td>Computational Biology</td>
<td>25</td>
</tr>
<tr>
<td>Computer Vision and Computational Photography</td>
<td>27</td>
</tr>
<tr>
<td>Machine Learning</td>
<td>28</td>
</tr>
<tr>
<td>Robotics</td>
<td>31</td>
</tr>
<tr>
<td>Speech and Language Technologies</td>
<td>33</td>
</tr>
<tr>
<td><strong>Visiting and Adjoint Faculty</strong></td>
<td>36</td>
</tr>
<tr>
<td><strong>Courtesy Faculty</strong></td>
<td>37</td>
</tr>
<tr>
<td><strong>Collaboration and Cooperation</strong></td>
<td>38</td>
</tr>
<tr>
<td><strong>Talks and Seminars</strong></td>
<td>39</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Workshops</td>
<td>44</td>
</tr>
<tr>
<td>Women in Theoretical Machine Learning Symposium</td>
<td>44</td>
</tr>
<tr>
<td>The Multifaceted Complexity of Machine Learning</td>
<td>44</td>
</tr>
<tr>
<td>New Horizons in Theoretical Computer Science</td>
<td>45</td>
</tr>
<tr>
<td>Distinguished Lecture Series</td>
<td>46</td>
</tr>
<tr>
<td>Education</td>
<td>48</td>
</tr>
<tr>
<td>The PhD Program</td>
<td>48</td>
</tr>
<tr>
<td>Graduates, Diplomas, and Awards</td>
<td>48</td>
</tr>
<tr>
<td>Quality Curriculum</td>
<td>50</td>
</tr>
<tr>
<td>Course Enrollment Numbers for TTIC Courses</td>
<td>50</td>
</tr>
<tr>
<td>Financial Support for Students</td>
<td>50</td>
</tr>
<tr>
<td>Academics in the COVID-19 Pandemic</td>
<td>51</td>
</tr>
<tr>
<td>New Courses</td>
<td>52</td>
</tr>
<tr>
<td>Student Publications, Posters, and Abstracts 2020-21</td>
<td>53</td>
</tr>
<tr>
<td>Student Admissions and Student Body Growth</td>
<td>55</td>
</tr>
<tr>
<td>Notes from the Chief Financial Officer</td>
<td>56</td>
</tr>
<tr>
<td>Financial Reports</td>
<td>58</td>
</tr>
<tr>
<td>Interns and Visiting Scholars</td>
<td>60</td>
</tr>
<tr>
<td>Constituent and Community Outreach</td>
<td>61</td>
</tr>
<tr>
<td>Addressing Violence Against People of Asian Descent</td>
<td>61</td>
</tr>
<tr>
<td>Institute Donation to India in Crisis</td>
<td>61</td>
</tr>
<tr>
<td>Promoting Diversity, Equity and Inclusion</td>
<td>62</td>
</tr>
<tr>
<td>Governance</td>
<td>64</td>
</tr>
<tr>
<td>Board of Trustees</td>
<td>64</td>
</tr>
<tr>
<td>Leadership and Administration</td>
<td>69</td>
</tr>
<tr>
<td>Non-Discrimination Statement</td>
<td>69</td>
</tr>
<tr>
<td>Special Thanks</td>
<td>70</td>
</tr>
</tbody>
</table>
The Research Mission

TTIC aims to achieve international impact through world-class research in fundamental computer science and information technology. Here we clarify the intended meaning of the terms in this statement.

Impact. The mission statement focuses on academic impact. A number of criteria may serve to evaluate such impact. These include volumes of peer-reviewed publications; reputation of venues in which publications appear; visibility of work in the community, as expressed in citations by others; number and reputation of co-authors, in particular in other institutions; recognition by the research community, including awards, prizes, invited talks, and invitation or election to serve in senior service positions in professional organizations; reports by external advisory bodies comprised of reputable senior researchers, etc. Precise objective measures of academic impact are controversial and elusive, and no one of the criteria above is alone a solid measure in itself. However, the combined evaluation of these and similar criteria helps assess the academic impact achieved by TTIC researchers.

Note that the number of patents filed, or the amount of extramural research funding, are not considered measures of academic impact. Although funding is clearly an important tool in achieving impact, it is only a tool and not an end in itself.

Fundamental. The mission statement is intended to focus on scientifically fundamental research. A scientific result is fundamental to the extent that it has open-ended implications. It is important to distinguish being fundamental from being economically important. A calendar program can be economically successful, and hence important, without adding to fundamental knowledge. The concept of NP-completeness adds greatly to the fundamental understanding of computation without having clear economic significance.

Computer Science and Information Technology. Computer science and information technology encompass many sub-disciplines. In the selection of sub-disciplines for study at TTIC, there should be some consideration of relevance to society as a whole. The interpretation of “computer science” and “information technology” should be such that TTIC remains relevant to the societal impact of computation and information.
The Education Mission

The education mission of TTIC is to achieve international impact through the accomplishments of its graduates as productive scientists and citizens. The notion of “impact” in the education mission is broader than in the research mission. Graduates of TTIC may achieve impact by starting successful companies, managing successful products, or influencing government directions in research funding. Of course, TTIC also strives to produce PhDs who achieve academic impact throughout their careers.

The institute strives to produce graduates who contribute to society through their intellectual leadership in computer science and information technology. Success in the education mission requires appropriate selection of curriculum, effective teaching to enable learning, effective assessment and mentorship of students, and effective marketing of students in the job market.

TTIC strives to place its PhD graduates at high-quality research institutions. TTIC also strives to make its PhD students visible to the academic community before graduation. This can be done most effectively through publications prior to graduation.
The 2020-2021 academic year was a new and different experience for all of us, due to the continuing impact of the COVID-19 global pandemic, but it was also a year of important and substantial progress in TTIC’s mission of research and education. Despite the challenges of remote operations, TTIC students and faculty had many research accomplishments, important publications, and completed dissertations. We held many interesting and enlightening seminars and distinguished lectures, had several successful qualifying exams, and hosted a large number of visitors – almost exclusively remotely.

Our new students, faculty, and administrative staff became vital and contributing members of the TTIC community, even though they rarely met in person. While the coming year is expected to bring significantly increased – and sorely missed – face-to-face interactions, I am proud of how TTIC has met the year’s challenges, continued to excel in our work and achievements, and supported one another both professionally and personally.

During the past academic year, we welcomed new PhD students, Research Assistant Professors, postdoctoral scholars, an administrative staff member (Liz Clay), and several remote visiting students. We graduated PhD students, who are now taking the next steps in their careers. We also welcomed four new Trustees to the Board, and Dr. Eric Grimson became the new Chair of the Board upon Dr. Sadaoki Furui’s retirement. The TTIC community acknowledges and greatly appreciates Dr. Furui’s service to TTIC as both former President and Board Chair – thank you!

Despite limited opportunities for face-to-face interaction in 2020-2021, TTIC continued its strong partnerships with TTI in Nagoya, Japan and the University of Chicago, including remote teaching and research collaboration. We were honored to have TTIC President Prof. Kazuo Hotate and UChicago Vice President Prof. Juan de Pablo join the TTIC Board of Trustees this year.

Several awards and honors were bestowed on TTIC faculty and students this academic year, providing more evidence of TTIC’s excellence and expanding our scholarly reputation. The faculty also received several new grants from various sources, including the National Institutes of Health, the National Science Foundation, Google, and Adobe, totaling about $1.6M.

Congratulations are in order to Prof. Karen Livescu, who received a promotion to Full Professor this year. Karen is a leader in the area of speech and language processing and related aspects of machine learning, and her contributions and insights in areas such as representation learning, acoustic word embeddings, multi-lingual speech embeddings, and applications to sign language recognition and low-resource languages have had tremendous impact. She has been a superb teacher, mentor, and contributor in a variety of ways at TTIC, and the promotion is well deserved.
After the renovation of our space was completed in November 2020, including the addition of about a half-floor for TTIC to expand into, we opened our doors for (limited) in-person activities. The renovated space will better suit TTIC’s needs in several ways, and we are all excited to make great use of it as we transition back to regular operations.

TTIC is a special place for students, faculty, and staff to learn, collaborate, discover, and work. I am constantly impressed by the quality of the people and the work here, and it is exciting to interact daily with people who are current and future leaders in some of the most important and impactful areas of computing. It has been a great year, and I look forward to the new opportunities and accomplishments at TTIC in 2021-2022.

Matthew Turk
President
2020-2021 was a fully virtual year, and I am again proud of the TTIC community – our students, faculty, and staff – for continuing to excel and produce fantastic work under these challenging conditions. In the meantime, our renovation was completed, and it looks great. Hopefully we will be able to have an increasingly in-person / in-person-optional experience this coming year.

TTIC’s faculty and students won a number of notable awards. Prof. Karen Livescu was elected Fellow of the International Speech Communication Association, and President Matthew Turk was elected Fellow of the ACM. Student Naren Manoj received an NSF Graduate Fellowship, and student Freda Shi was awarded a Google PhD Fellowship. Also in collaborative work, TTIC students Takuma Yoneda and Chip Schaff, TTIJ student Takahiro Maeda, and Prof. Matt Walter won first place at the Max Planck Institute Real Robot Challenge. To see how they did it, see their paper “Grasp and Motion Planning for Dexterous Manipulation for the Real Robot Challenge”. Congratulations to all!

This year we hired five new Research Assistant Professors (RAPs): Kartik Goyal (PhD, Carnegie Mellon University), Hongyuan Mei (PhD, Johns Hopkins University), Derek Reiman (PhD, University of Illinois at Chicago), Lingxiao Wang (PhD, UCLA), and Raymond Yeh (PhD, University of Illinois at Urbana-Champaign).

We also said farewell to five who will be going on to new positions next year: Arturs Backurs and Sepideh Mahabadi who will be Senior Researchers at Microsoft Research, Steve Hanneke who will be an Assistant Professor at Purdue, Mina Karzand who will be an Assistant Professor at UC Davis, and Sam Wiseman who will be an Assistant Professor at Duke.

We anticipate that four of our current PhD candidates will complete the program this fall: Nick Kolkin (advised by Greg Shakhnarovich), RT Luo (advised by Greg Shakhnarovich), Lifu Tu (advised by Kevin Gimpel), and Blake Woodworth (advised by Nathan Srebro). Congratulations! I wish them all the best, and look forward to seeing their continued accomplishments in the years to come.

TTIC continues to be an exciting place full of intellectual activity and a spirit of scientific curiosity. I am proud to be a part of this amazing academic community.

Avrim Blum
Chief Academic Officer
The COVID-19 global pandemic led TTIC and institutions around the globe to operate in a remote delivery format starting in March 2020. The 2020-2021 academic year started with a rapid spread of COVID-19 throughout the fall quarter and into the winter. TTIC’s COVID-19 Response Group continued to meet weekly and to monitor the city, state, and federal responses as well as University of Chicago announcements and measures.

The internal COVID-19 information and resources page was frequently updated to reflect the changing public health protocols, and forms were made accessible so the TTIC community could communicate to TTIC management (anonymously if desired) any needs, struggles, or suggestions regarding TTIC’s COVID-19 planning, response, or remote operations, and to report any safety or health protocol concerns. The resources site also includes information regarding safety protocols and responsibilities, self-monitoring and reporting of COVID-19 exposure or infection, vaccination availability, mental health and coping resources, and special considerations for international students and scholars.

For Autumn, Winter, Spring, and Summer Quarters, the Response Group provided information to the community about plans for the upcoming term regarding courses, building access, meetings, travel, etc. TTIC continued to provide an allowance to all personnel in order to help cover costs related to remote work, which started when we first began remote operations in early 2020.

Most TTIC operations were fully remote all year, including courses, talks, meetings, interviews, external conferences, Board of Trustee meetings, and even tea times. Admission and recruitment seasons were conducted virtually, and we explored new ways to connect with applicants and researchers on the market. Once the building opened in November 2020 after the renovation, students, staff, and faculty who wanted to come into the building could complete safety protocols training and submit an attestation form to help ensure understanding of and compliance with the important requirements and protocols. A facility access sign-in form allowed TTIC to maintain safe capacity levels, assigned work spaces for those who came in, and served as a tool for contact tracing in the event of infections.

Throughout the pandemic, TTIC has emphasized providing a safe and supportive environment, trying to balance our mission and strong desire to push forward in our work with being flexible and accommodating to the many difficult and challenging situations we’ve all faced. The 2021-22 academic year will start with a vaccination requirement similar to that of the University of Chicago, and the institute anticipates moving towards more in-person operations as the Autumn Quarter 2021 progresses.
TTIC COVID-19 Response Group

Avrim Blum, Chief Academic Officer
Adam Bohlander, Director of IT
Chrissy Coleman, Administrative Director of Graduate Studies
Jessica Jacobson, Chief Financial Officer
Amy Minick, Director of Human Resources
Matthew Turk, President
### Institute Overview

#### Faculty and Staff

<table>
<thead>
<tr>
<th>Title</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>8</td>
</tr>
<tr>
<td>Associate Professors</td>
<td>2</td>
</tr>
<tr>
<td>Assistant Professors</td>
<td>2</td>
</tr>
<tr>
<td>Research Assistant Professors</td>
<td>14</td>
</tr>
<tr>
<td>Adjoint Faculty</td>
<td>9</td>
</tr>
<tr>
<td>Administrative Office Staff</td>
<td>11</td>
</tr>
<tr>
<td>and IT</td>
<td></td>
</tr>
<tr>
<td>Postdocs</td>
<td>6</td>
</tr>
</tbody>
</table>

#### PhD Program

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students enrolled 2020-21</td>
<td>44</td>
</tr>
<tr>
<td>Master’s Degrees Awarded (in September 2020)</td>
<td>7</td>
</tr>
<tr>
<td>PhD Degrees Awarded (in September 2020)</td>
<td>3</td>
</tr>
<tr>
<td>Applicants for the 2020-21 Academic Year</td>
<td>227</td>
</tr>
<tr>
<td>Anticipated Enrolling 2021-22</td>
<td>5*</td>
</tr>
</tbody>
</table>

*3 students deferred matriculation from 2020 to 21 due to COVID-19
Awards and Honors

July 2020 - Steve Hanneke
Prof. Steve Hanneke and his co-authors were awarded the Best Paper Award at the Conference on Learning Theory (COLT) 2020 for the paper “Proper Learning, Helly Number, and an Optimal SVM Bound.” The paper dealt with problems in PAC learning, classification, excess risk bounds and generalization error bounds.

November 2020 - Matthew Turk
On Thursday, November 19, 2020 President Matthew Turk gave a Keynote speech at the Institute of Electrical and Electronics Engineers (IEEE) Conference on Automatic Face and Gesture Recognition. His talk was titled "Is FG Enabling a Surveillance Dystopia?"

December 2020 - Chip Schaff and Takuma Yoneda
In the fall of 2020, TTIC participated in the Max Planck Institute for Intelligent Systems’ Real Robot Challenge. Conducted remotely from August to December, participants wrote code that was run on robots that were all housed at Max Planck in Stuttgart, Germany. TTIC’s team won first place in the challenge, led by PhD students Charles Schaff and Takuma Yoneda.

January 2021 - Matthew Turk
President Matthew Turk was named a 2020 Fellow of the Association for Computing Machinery (ACM), the world’s leading computing society. Dr. Turk was recognized for his “contributions to face recognition, computer vision, and multimodal interaction.” The distinction of Fellow is the ACM’s highest membership grade, awarded to less than 1% of members worldwide for outstanding accomplishments in computing.

January 2021 - Freda Shi
Third-year PhD candidate Freda Shi was awarded a 2021 Google PhD Fellowship in Natural Language Processing. Her proposal centered around research that will be reflected in her PhD thesis, which will discuss learning language structures through grounding signals. The fellowship is a two-year award, but has the potential to be extended to three years.

March 2021 - Naren Manoj
Second-year PhD student Naren Manoj was awarded a 2021 National Science Foundation (NSF) Graduate Research Fellowship. With only 2,000 fellows named each year, the program provides funding and other resources to a select group of scholars pursuing graduate research in STEM fields. The acceptance rate in 2019 was 16%, from a pool of 12,200 applicants.

May 2021 - Karen Livescu
In recognition of her “contributions to articulatory modeling, to speech representation learning, and to bridging the gaps between speech research, machine learning and natural language processing,” Prof. Karen Livescu has been elected a fellow of the International Speech Communication Association (ISCA). The ISCA honors a select number of members each year for significant contributions to their field.
At the May 2021 meeting of the Board of Trustees, upon recommendation of the President, the Trustees approved Karen Livescu for promotion to full Professor. This promotion will be in effect as of October 2021.

Prof. Livescu received her B.A. in Physics from Princeton University in 1996 and spent the following year as a visiting student in Electrical Engineering at the Technion, Israel. She received her M.S. and Ph.D. in Electrical Engineering and Computer Science at the Massachusetts Institute of Technology, in 1999 and 2005. In 2005-2007 she was a postdoctoral lecturer in the Electrical Engineering and Computer Science department at the Massachusetts Institute of Technology.

Her research interests are in speech and language processing, recently focusing on speech recognition. She is particularly interested in statistical modeling techniques that can take advantage of both large stores of data and knowledge from linguistics and speech science.

Prof. Livescu has supervised 3 TTIC alumni: Hao Tang, who continued as a postdoc at MIT, and is now a lecturer at the University of Edinburgh; Taehwan Kim, who continued as a postdoc at CalTech, and is now at Amazon Alexa; and Bahador Nooraei, who continued to Groupon. She is currently advising 7 students in the PhD program, Ankita Pasad, Shane Settle, Bowen Shi, Freda Shi, Qingming Tang, Shubham Toshniwal, and David Yunis.

She has also served on a number of thesis committees, and advised several postdocs, research interns, and visiting students. Prof. Livescu has served as TTIC’s Student Support Coordinator since 2018, and as Colloquium Coordinator since 2014.
Faculty by Area

Algorithms and Complexity
Arturs Backurs
Avrim Blum
Julia Chuzhoy
Sepideh Mahabadi
Yury Makarychev
Thatchaphol Saranurak
Saeed Seddighin
Madhur Tulsiani

Machine Learning
Brian Bullins
Steve Hanneke
Filip Hanzely
Mina Karzand
David McAllester
Nathan Srebro
Danica Sutherland

Computational Biology
Michael Yu
Jinbo Xu

Robotics
Audrey Sedal
Bradly Stadie
Matthew Walter

Computer Vision and Computational Photography
Greg Shakhnarovich
Matthew Turk

Speech and Language Technologies
Karen Livescu
Kevin Gimpel
Mrinmaya Sachan
Sam Wiseman

Post-Docs
Hedyeh Beyhaghi | PhD - Cornell University
Xiaoyang Jing | PhD - Fudan University
Pritish Kamath | PhD - MIT
Ali Vakilian | PhD - MIT
Shirley Wu | PhD - University of Texas at Austin
Hongyang Zhang | PhD - Carnegie Mellon University
Newly Renovated Facility

In the spring of 2021, renovations of TTIC’s space at 6045 South Kenwood Avenue were completed by San Francisco-based architectural firm Gensler. The goal of the project was to reflect the heart of TTIC: research, education, and collaboration. With attention directed toward communal areas, the spaces adjacent to the atrium on the fifth and fourth floors, the new design of our space reinforces TTIC’s distinct identity, and provides a modern and thoughtful environment that promotes state-of-the-art work being conducted.

TTIC’s facility is now nearly 35,000 square feet, and features sweeping views of the Chicago skyline, Lake Michigan, the Midway Plaisance, and the collegiate gothic architecture of the University of Chicago. The fifth floor has a new and improved classroom, complete with a movable partition wall to create two smaller classrooms when needed. The classrooms are equipped with a full AV system with broadcasting capabilities. The focal point of the fourth floor is the main café, and the adjacent collaboration space. The new robotics lab is double the size of the old lab, and features glass walls to better highlight student work.

All existing private offices and storage rooms on both the fifth and fourth floors have been refreshed with coordinating colors, carpets, and wall bases. The new elements on these floors, including the student workstations, collaboration areas, café, and conference room, have been updated with coordinating finishings and furniture. Ceiling baffles were installed for acoustical control in key common areas. There are also sizable whiteboards throughout all common areas.

The newly acquired south side of the third floor has been transformed into a space for administrative staff offices and functions. All private office doors have been equipped with a sidelite frame for additional natural light, and the new large conference room has a fully integrated AV system. The space includes a small café and a significant amount of storage. The interior finishes and furnishings are coordinated with the décor on the fifth and fourth floors. Thank you to the members of TTIC’s Design Committee for your help and vital input in the renovation process. We look forward to sharing the newly renovated space with the entire TTIC community.
Renovation Design Committee

Jessica Jacobson, Chief Financial Officer
Matthew Turk, President
Yury Makarychev, Professor
Alicia McClarin, Administrative Assistant
**Board Chair Succession**

In May of 2021, Dr. Eric Grimson was named the new Board Chair of TTIC’s Board of Trustees. He succeeds Dr. Sadaoki Furui, who also served as the former President of TTIC. Dr. Grimson is the Chancellor for Academic Advancement at MIT CSAIL, has served on TTIC’s Board of Trustees since 2015, and is an advisor on the institute's External Advisory Committee. TTIC is grateful to Dr. Grimson for his dedication and service and confident that under his leadership, the board will continue to strive for excellence and help TTIC grow as a world-class institution.

The Board expressed thanks Dr. Furui for his years of dedication to the Institute, as both President and Chair of the Board of Trustees. In May of 2021, the newly renovated conference room 501 was named in his honor. His friends and colleagues at TTIC wish him all the best, and will be forever grateful for his contributions to our academic community.

**New Award Recognizes Administrator Achievements**

Manager of Research Administration Rose Bradford was awarded the first annual Latrice Richards Outstanding Administrator Award at the 2020 diploma and awards ceremony. This award was created to recognize a member of the administrative staff who has gone above and beyond to make TTIC a great place to work and study.

Rose received this year’s award for her community outreach efforts, forging lasting relationships within our South Side community to increase access to STEM education for K-12 students in underserved schools. Rose’s dedication, enthusiasm and expertise elevate and serve the mission of TTIC and we look forward to her continued success. Award recipient names are engraved on a commemorative plaque at TTIC.

**Communicating the Story of TTIC**

In January 2021, Liz Clay began working in the newly created role of TTIC Communications Administrator. The institute aims to promote the exciting work and robust accomplishments being produced at TTIC, and we believe the best way to accomplish this is by telling compelling stories. Liz is chairing the website committee, focusing on website content curation, expanding TTIC’s social media footprint, conducting communications policy and procedure review and development, exploring outreach opportunities, drafting and designing print publications, and creating many new “highlight articles” and news items featuring faculty and students, their work, accolades, interests, and backgrounds.

The Office of Communications hopes to continue to support our students and faculty by increasing their visibility to the greater computer science community, and promoting the groundbreaking research being conducted on our campus.
Sponsored Research

In FY 20-21, tenured and tenure-track faculty were awarded 8 grants totaling over $1.5M. The current grants portfolio includes:

- 17 National Science Foundation basic and collaborative research awards
- 2 National Science Foundation Graduate Research Fellowship awards
- 2 Google PhD Fellowships
- 3 National Institute of Health awards
- 2 Department of Defense awards
- 2 Simons Foundation awards
- Recent corporate awards from Google and Adobe.
Research Philosophy

Research is the heart and soul of activity at the Toyota Technological Institute at Chicago. The institute has an energetic and determined team of professors, visiting professors, assistant professors, research assistant professors, adjoint professors, and post-docs encompassing many areas of research interests, and from many countries and backgrounds, each bringing their own specialty to the Institute.

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 opportunity for close and cooperative research with not only the Computer Science Department, but with the departments of Mathematics, Statistics and the Booth Graduate School of Business. There are also many guests and visitors who come to TTIC to give talks, participate in workshops, and share their research findings, all heightening the feeling of enthusiasm 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: machine learning, algorithms and complexity, computer vision and computational photography, speech and language technologies, computational biology, and robotics. The areas are introduced below, and in some, TTIC’s strategy for achieving impact is also described. A key part of the strategy for achieving impact in all areas is to foster collaboration and communication between these areas.

Algorithms and Complexity

One of the central tasks in all areas of computer science is the writing of efficient software to perform required computation. In order to write such software, one must first design an efficient algorithm for the computational task at hand. The area of algorithms focuses on designing algorithms, and more generally developing powerful algorithmic tools, for solving fundamental computational problems that frequently occur in different areas of computer science. Complexity theory is the study of the power and limits of efficient computation. The central problem studied by complexity theorists is “Which computational problems can, and which cannot, be solved efficiently?” The study of algorithms and complexity is a part of a broader area called “theory of computer science,” or just “theory.” The area of theory works on developing theoretical foundations for computer science, which lead to a deeper understanding of computation in general, and specific computational tasks in particular, which include better algorithms and faster software. Below is a list of the work done at TTIC this year in the area of Algorithms and Complexity.
Arturs Backurs
Research Assistant Professor
ttic.edu/backurs

PUBLISHED/SUBMITTED PAPERS
Arturs Backurs, Liam Roditty, Gilad Segal, Virginia Vassilevska Williams and Nicole Wein. “Towards Tight Approximation Bounds for Graph Diameter and Eccentricities.” SICOMP.

TALKS

INvolvement
Program Committees: STOC 2021, SODA 2021
Conference Reviews: FOCS 2021, ITCS 2021, ICALP 2021, ESA 2021

Research Funding Awards
NSF Small Grant CCF-2006806

Avrim Blum
Professor and Chief Academic Officer
ttic.edu/blum

PUBLISHED/SUBMITTED PAPERS
Avrim Blum and Han Shao. “Online Learning with Primary and Secondary Losses”. NeurIPS 2020.

TALKS
IN INVOLVEMENT
Editorial board: Journal of the ACM
Steering Committee: FOCS, ITCS, FORC, ALT
Sponsorship Chair: ICML 2021
Co-Chair: Scientific Advisory Board, Simons Institute for the Theory of Computing
Conference Reviewing: ALT 2021, NeurIPS 2020, TEAC

RESEARCH FUNDING AWARDS

CLASSES/SEMINARS

MISCELLANEOUS
Advisor for: Kevin Stangl, Keziah Naggita (co-advised with Matt Walter), Han Shao, Naren Manoj (co-advised with Yury Makarychev), and Kavya Ravichandran (co-advised with Nati Srebro).
Thesis Committee: Paul Golz (CMU), Gabriele Farina (CMU), Saba Ahmadi (UMD), Mahsa Derakhshan (UMD), Soheil Behnezhad (UMD), Falcon Dai (TTIC), Omar Montasser (TTIC).
Hosted summer interns: 2020: Saba Ahmadi (UMD/NU), Soheil Behnezhad (UMD), Mahsa Derakhshan (UMD). 2021: Marina Knittel (UMD).

Julia Chuzhoy
Professor
ttic.edu/chuzhoy

PUBLISHED/SUBMITTED PAPERS

TALKS
Plenary speaker, Mathematical Congress of the Americas 2021.

IN INVOLVEMENT
Editorial Board: SICOMP (until December 2020)
Steering Committee: SODA and ITCS

RESEARCH FUNDING AWARDS
NSF grant “AF: Small: Graph Theory and Its Uses in Algorithms and Beyond”, $398,163, 2020 - 2023.
Sepideh Mahabadi
Research Assistant Professor
ttic.edu/mahabadi

PUBLISHED/SUBMITTED PAPERS

TALKS
“Determinant Maximization over Large Data Sets.” Sub-linear Reading Group, MIT, 2020.

INVOLVEMENT
Program Committee: SODA 2021, STOC 2021, SoCG 2022, HALG 2022.
Reviewer: PODS 2022

CLASSES/SEMINARS

Yury Makarychev
Professor
ttic.edu/makarychev

PUBLISHED/SUBMITTED PAPERS

INVOLVEMENT
Executive Committee: IDEAL
Reviewer: Algorithmica, SODA 2021
Assisted organizers: STOC 2021
Guest Editor: Journal of Computer and System Sciences
RESEARCH FUNDING AWARDS
NSF Medium Award CCF-1955173, jointly with K. Makarychev (Northwestern).
TTIC's share is $475,645. 2020 - 2024.
NSF HDR TRPODS Award CCF-1934843, jointly with N. Srebro and our colleagues at Northwestern University and the University of Chicago. TTIC's share is $511,610. 2019 - 2022.

CLASSES/SEMINARS
TTIC 31100/CMSC 39010-1: Computational and Metric Geometry, Spring 2021. The course covers fundamental concepts, algorithms, and techniques in computational and metric geometry.

MISCELLANEOUS
Advisor: Naren Manoj (with Avrim Blum), Max Ovsiankin, Jafar Jafarrov (UChicago)
Internal Service: Co-Chair, Faculty Hiring Committee

Saeed Seddighin
Research Assistant Professor
ttic.edu/seddighin

PUBLISHED/SUBMITTED PAPERS

TALKS
“Solving Blotto and Beyond.” Isfahan UT Theory Seminar.

IN Volvement
Program Committee: TTCS 2021, AAAI 2021

HONORS/AWARDS
Adobe Research Award
Google Research Award

RESEARCH FUNDING AWARDS
Google Research Award, $30,000.
Adobe Research Award, $10,000.

MISCELLANEOUS
Hosted Summer Interns: Hamed Saleh and Marina Knittel.
Madhur Tulsiani  
Associate Professor and Director of Graduate Studies  
ttic.edu/tulsiani  

PUBLISHED/SUBMITTED PAPERS  

TALKS  

INVolvEMENT  
Managing Editor: Theory of Computing.  
Co-Organizer: “New Horizons in TCS” Summer School.  
Reviewer: FOCS, ICALP, JACM, Journal of Combinatorial Theory  

CLASSES/SEMINARS  
TTIC 31200/CMSC 37220: Information and Coding Theory, Spring 2021.  

MISCELLANEOUS  
Advised: Fernando Granha Jeronimo (UChicago), Dylan Quintana (UChicago), Mrinalkanti Ghosh (TTIC), Goutham Rajendran (UChicago), Shashank Srivastava (TTIC), Tushant Mittal (UChicago), June Wu (UChicago).  
Thesis Committee: Christopher Jones (UChicago)  

Computational Biology  
Computational biology studies biological systems (e.g., cell, protein, DNA and RNA) through mathematical modeling and optimization. Machine learning methods (e.g., probabilistic graphical model and deep learning) and optimization techniques (e.g., linear programming and convex optimization) have significant applications in this field. Algorithm design and complexity analysis also play an important role, especially when we want to know if there is an efficient algorithm that can find an exact or approximate solution to a specific biological problem. Below is a list of the work done at TTIC this year in the area of Computational Biology.  

Jinbo Xu  
Professor  
ttic.edu/xu  

PUBLISHED/SUBMITTED PAPERS  

25

TALKS
“Protein structure prediction by deep learning.” 2020.

IN VolvEMENT
Associate Editor: Journal of Bioinformatics
Area chair: ISMB 2021
PC member: RECOMB

RESEARCH FUNDING AWARDS
Jinbo Xu. NIH/NIGMS 1R01GM089753-06A1. New Computational Methods for Data-Driven Protein Structure Prediction. 2020-2024. $330,000 per year.

Michael Yu
Research Assistant Professor
ttic.edu/yu

PUBLISHED/SUBMITTED PAPERS

TALKS
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. Below is a list of the work done at TTIC this year in the area of Computer Vision and Computational Photography.

**Greg Shakhnarovich**  
Professor and Director of Admissions  
ttic.edu/gregory

**PUBLISHED/SUBMITTED PAPERS**


**TALKS**

**IN Volvement**
Area Chair: CVPR 2021, ECCV 2020, ICLR 2021, ICCV 2021  
Associate Editor: TPAMI

**RESEARCH FUNDING AWARDS**
"Scalable Self-Supervised Learning for 3D Scene Understanding." TRI University 2.0 program. $522,612 (for 3 years).

Adobe corporate gift in support of research, $20,000.

"Machine Learning to Improve Targeted Cancer Therapy." University of Chicago CDAC award. $249,930 (for 2 years, as a co-PI; PI is S. Riesenfeld, UoC).

**CLASSES/SEMINARS**


Organized instruction for Introduction to Machine Learning at TTI Nagoya.

**MISCELLANEOUS**
Advisor: Nicholas Kolkin, Rouotan Luo, Steven Basart (UoC) desis (co-advised with Yali Amit)

Internal Service: Co-chair, TTIC Committee on Diversity and Inclusion
Machine Learning

Machine Learning generally refers to an engineering or design paradigm where systems are built based on automatic training from examples rather than detailed expert knowledge, much in the same way humans learn how to perform tasks and interact with the world. Most of modern Machine Learning is statistical in nature, and builds on statistical and probabilistic tools, as well as on algorithmic and computational developments. Especially in recent years, as training data is becoming plentiful, and massive computational and storage resources needed for handling the data are also becoming available, Machine Learning is playing a key role in many application areas. This includes classic artificial intelligence problems, such as computer vision, robotics, machine translation, question answering and dialogue systems. There are also a variety of “non-human” problems such as information retrieval, search, bioinformatics, and stock market prediction to be considered. Below is a list of the work done at TTIC this year in the area of Machine Learning.

Brian Bullins
Research Assistant Professor
ttic.edu/bullins

PUBLISHED/SUBMITTED PAPERS
TALKS

IN INVOLVEMENT
Conference Reviews: NeurIPS 2020, ICLR 2021, ICML 2021

David McAllester
Professor
ttic.edu/mcallester

PUBLISHED/SUBMITTED PAPERS

TALKS
“MathZero, the Classification Problem, and Set-Theoretic Type Theory.” Princeton Institute for Advanced study Seminar on Theoretical Machine Learning.

CLASSES/SEMINARS

IN INVOLVEMENT
Area Chair: ICLR 2021, NeuRIPS 2021

Nathan Srebro
Professor
ttic.edu/srebro

PUBLISHED/SUBMITTED PAPERS

TALKS
“What, How and When can we Learn Adversarially Robustly?” Weizmann Institute, 2021.

RESEARCH FUNDING AWARDS
NSF-Simons Research Collaborations on the Mathematical and Scientific Foundations of Deep Learning, $10 million.

CLASSES/SEMINARS
Reading Group on Machine Learning and Optimization
TTIC 31000: Research at TTIC, Autumn 2020.
TTIC31120: Statistical and Computational Learning Theory, Autumn 2020. Taught concurrently at TTIC and EPFL.

INVOLVEMENT
Editorial Board: JMLR
Senior Area Chair: ICML 2021
Organizer: IDEAL Special Quarter on Theory of Deep Learning

Danica J. Sutherland
Research Assistant Professor
ttic.edu/sutherland

PUBLISHED/SUBMITTED PAPERS

TALKS

INVOLVEMENT
Area Chair (or equivalent): NeurIPS 2020, AISTATS 2021, AAAI 2020.

MISCELLANEOUS
Thesis committees: Iryna Korshunova (Ghent University) Tong Che, Cambridge University)
Robotics can generally be defined as a field concerned with the development and realization of intelligent, physical agents that are able to perceive, plan, and act intentionally in an uncertain world. Robotics is a broad field that includes mechanical design, planning and control, perception, estimation, and human-robot interaction among others. At TTIC, robotics research currently focuses on developing advanced perception algorithms that endow robots with a rich awareness of, and the ability to act deliberately, within their surroundings. Researchers are particularly interested in algorithms that take multi-modal observations of a robot’s surroundings as input, notably image streams and natural language speech, and infer rich properties of the people, places, objects, and actions that comprise a robot’s environment. Integral to these technologies is their reliance on techniques from machine learning in developing probabilistic and statistical methods that are able to overcome the challenge of mitigating the uncertainty inherent in performing tasks effectively in real-world environments. These tasks include assistive technology for people living with physical and cognitive impairments, healthcare, logistics, manufacturing, and exploration. Below is a list of the work done at TTIC this year in the area of Robotics.

Audrey Sedal
Research Assistant Professor
ttic.edu/sedal

PUBLISHED/SUBMITTED PAPERS

TALKS
“Force reversal and energy dissipation in composite tubes through nonlinear viscoelasticity of component materials,” University of Manchester Mathematics of Waves and Materials Group, 2021.

CLASSES/SEMINARS

IN VolVEMENT
Associate Editor: IEEE ICRA 2022

Bradly Stadie
Research Assistant Professor
ttic.edu/stadie

PUBLISHED/SUBMITTED PAPERS

IN VolVEMENT
Reviewer: ICML, ICLR, NeurIPS, NeurIPS Deep Learning Workshop
Area Chair: Meta Learn Workshop
CLASSES/SEMINARS

MISCELLANEOUS
Internal Service: Website Committee, Sexual Harassment Policy Committee

Matthew Walter
Assistant Professor
ttic.edu/walter

PUBLISHED/SUBMITTED PAPERS

INVOILEMENT
Associate Editor: IEEE RA-L, ACM THRI
Area Chair: ICLR, NeurIPS, CoRL, ICML
Steering Committee: Northeast Robotics Colloquium
Panelist: NSF Graduate Research Fellowship Program
Contributor: AI Driving Olympics (AI-DO), NeurIPS, 2020
Board Member: Duckietown Foundation
Senior Program Committee: AAAI
Program Committee: EMNLP, AISTATS
Co-Organizer: CVPR 2021 Workshop on Frontiers of Monocular 3D Perception, IROS 2020 Workshop on Benchmarking Progress in Autonomous Driving

CLASSES/SEMINARS
TTIC 31170: Robot Learning and Estimation, Spring 2021.
Robotics Reading Group

MISCELLANEOUS
Qualifying Exam Committee Chair: Naren Manoj (TTIC), Vadim Grinberg (TTIC)
Thesis Committee Member: Jacob Arkin (University of Rochester) Igor Vasiliejevic (TTIC)
Thesis Examiner: James Mount (Queensland University of Technology)
Mentor: Jesus Duran (Chicago Public Schools)
TTIC Young Researcher Seminar Series Czar
Senior Member: IEEE
This area is concerned with getting computers to analyze and extract information from spoken language, as well as to generate spoken audio. At TTIC, current speech research focuses mainly on the analysis side. For example, speech recognition is the problem of transcribing the words being spoken in an audio signal, such as that recorded from a microphone. Speech processing heavily relies on techniques from machine learning and statistics, as well as ideas from linguistics and speech science, and shares algorithms with computer vision and computational biology. This area has applications such as automated telephone information centers, dictation systems, machine translation, archiving and search of spoken documents, assistance for the visually or hearing-impaired, and other human-computer interface systems. Below is a list of the work done at TTIC this year in the area of Speech and Language Technologies.

Kevin Gimpel  
Assistant Professor  
ttic.edu/gimpel

PUBLISHED/SUBMITTED PAPERS  
Mingda Chen, Kevin Gimpel. “Learning Probabilistic Sentence Representations from Paraphrases.” 5th Workshop on Representation Learning for NLP.  

TALKS  

IN Volvement  
Senior Area Chair: Machine Learning for NLP: Language Modeling and Sequence to Sequence Models, NAACL 2021.  
Journal reviewing: TACL
Karen Livescu
Associate Professor
ttic.edu/livescu

PUBLISHED/SUBMITTED PAPERS

TALKS

INVOLVEMENT
Associate Editor: IEEE TPAMI, IEEE OJ-SP
Area Chair: Interspeech 2021, EMNLP 2020
Co-organizer: NeurIPS Workshop on Self-Supervised Learning for Speech and Audio Processing
Standing Review Committee Member: Transactions of the ACL
Reviewer: CVPR 2021, Computer Speech and Language

HONORS/AWARDS
ISCA Fellow, IEEE SPS Distinguished Lecturer
RESEARCH FUNDING AWARDS
NIH R01MD015064-01A1 sub-award: ‘Primed to (re)act: Can changes in procedural language prevent adverse events between police and minority male youth?’ 2021.

CLASSES/SEMINARS

MISCELLANEOUS
Advisor: Ankita Pasad (TTIC), Shane Settle (TTIC), Bowen Shi TTIC), Freda (Haoyue) Shi, co-advised with Kevin Gimpel (TTIC), Qingming Tang (TTIC), Shubham Tosniwal, co-advised with Kevin Gimpel (TTIC), David Yunis (TTIC), Ju-Chieh Chou (GSAL), Puyuan (Jason) Peng (University of Chicago), Yushi Hu (Visiting TTIC Student) Thesis Committees: Lifu Tu (TTIC), Marcely Zanon Boito (Universite Grenoble Alpes) Internal Service: Colloquium Coordinator, Student Support Coordinator, Student Workshop Faculty Advisor University of Chicago Service: CDAC Steering Committee Member
Visiting and Adjoint Faculty

David Chiang
Adjunct Professor, TTIC
Associate Professor, University of Notre Dame
PhD - University of Pennsylvania

Eden Chlamtac
Visiting Professor, TTIC
Assistant Professor, Ben Gurion University
PhD - Princeton University

David Forsyth
Adjunct Professor, TTIC
Professor, University of Illinois at Urbana-Champaign
PhD - Balliol College, Oxford

Sanjeev Khanna
Adjunct Professor, TTIC
Professor, University of Pennsylvania
PhD - Stanford University

Richard Lipton
Adjunct Professor, TTIC
Professor and Frederick G. Storey Chair (Emeritus)
Georgia Institute of Technology
PhD - Carnegie Mellon University

Robert Nowak
Adjunct Professor, TTIC
Professor, University of Wisconsin-Madison
PhD - University of Wisconsin-Madison

Alexander Razborov
Resident Adjunct Professor, TTIC
Professor, University of Chicago
PhD - Steklov Mathematical Institute

Yutaka Sasaki
Adjunct Professor, TTIC
Professor, TTI-Japan
PhD - University of Tsukuba

Norimichi Ukita
Adjunct Professor, TTIC
Professor, TTI-Japan
PhD - Kyoto University

Stephen Wright
Adjunct Professor, TTIC
Professor, University of Wisconsin-Madison
PhD - University of Queensland
László Babai  
George and Elizabeth Yovovich Professor  
Departments of Computer Science and Mathematics  
University of Chicago  
PhD - Hungarian Academy of Sciences, Budapest

Michael Maire  
Assistant Professor  
Department of Computer Science  
University of Chicago  
PhD - University of California, Berkeley

Allyson Ettinger  
Assistant Professor  
University of Chicago  
PhD - University of Maryland, College Park

Aaron Potechin  
Assistant Professor  
University of Chicago  
PhD - MIT

Janos Simon  
Professor and Director of Graduate Studies  
Department of Computer Science  
University of Chicago  
PhD - Cornell University

Michael Franklin  
Liew Family Chair of Computer Science  
University of Chicago  
PhD - University of Wisconsin

Mladen Kolar  
Associate Professor of Econometrics and Statistics  
Booth School of Business  
University of Chicago  
PhD - Carnegie Mellon University

Chenhao Tan  
Assistant Professor  
University of Chicago  
PhD - Cornell University

Risi Kondor  
Assistant Professor  
Departments of Computer Science and Statistics  
University of Chicago  
PhD - Columbia University

Rebecca Willett  
Professor  
Departments of Statistics and Computer Science  
University of Chicago  
PhD - Rice University
TTIC wishes to congratulate TTIIJ in celebrating its 40th anniversary, as well as the 25th anniversary of its doctoral program.

Professor Matt Walter is teaching a MOOC (Massive Online Open Course) on Duckietown, a project teaching fundamental lessons in robotics and AI. He is teaching the course along with his colleagues Liam Paull (University of Montreal Professor), Andrea Censi (Senior Researcher at ETH Zurich), Jacopo Tani (Senior Researcher at ETH Zurich), Stefanie Tellex (Brown University Professor), Nick Wang (National Chiao Tung University, Taiwan Professor), and Kirill Krinkin (Head of The Department of Software Engineering and Computer Applications at St. Petersburg Electrotechnical University).

PhD candidate Freda Shi collaborated with Sida Wang (Facebook Research Scientist) and Luke Zettlemoyer (U Washington Professor, Facebook Research Scientist) on lexicon induction from monolingual corpora during her internship at Facebook. She also collaborated with Jiayuan Mao (MIT Ph.D. student), Jiajun Wu (Stanford Assistant Professor), Roger Levy (MIT Professor) and Josh Tenenbaum (MIT Professor) on a grounded grammar induction project.

President Matthew Turk has been working with PhD student Jedrzej Kozerawski (UC Santa Barbara) on meta-learning for few-shot image classification. He also collaborated with Prof. E. R. (Roy) Davies (University of London) on a book entitled "Advanced Methods and Deep Learning in Computer Vision."

PhD Candidate Igor Vasiljevic collaborated with TTIC Professor Greg Shakhnarovich, Adrien Gaidon (Head of Machine Learning Research at Toyota Research Institute), Vitor Guizilini (TRI Research Scientist), Rares Ambrus (TRI Research Scientist), Sudeep Pillai (TRI ML-Engineering Lead), and Wolfram Burgard (University of Freiburg Professor) on research regarding neural ray surfaces for self-supervised learning.

Professor Nathan Srebro is a collaborator in one of two new awards through the Mathematical and Scientific Foundations of Deep Learning (MoDL) program. The NSF Directorates for Mathematical and Physical Sciences (MPS), Computer and Information Science and Engineering (CISE), Engineering (ENG), and the Simons Foundation Division of Mathematics and Physical Sciences have partnered to sponsor the new research collaborations through MoDL focused on challenging questions in Mathematical and Scientific Foundations of Deep Learning.
Talks and Seminars

Talks and seminars are an important part of any academic institution. They are both a way for researchers to promote their research, and to keep abreast of recent developments. They allow students to be exposed to ideas and researchers that may play a role in shaping their academic views, research direction, or even career. Talks and seminars play an important role in establishing the level of intellectual activity and influx of innovative ideas at an institution: 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, as part of the TTIC Colloquium: a forum for talks by invited speakers on work of current relevance and broad interest to the computer science community. Other talks may be a part of the Research at TTIC series: a weekly seminar series presenting research currently underway at the Institute. Every week a different TTIC faculty member will present their research. The lectures are intended both for students seeking research topics and advisers, and for the general TTIC and University of Chicago communities interested in hearing what their colleagues are currently involved in. The Young Researcher Seminar Series features talks by PhD students and postdocs whose research is of broad interest to the computer science community. The series provides an opportunity for early-career researchers to present recent and promising work and to meet with students and faculty at TTIC and nearby universities. Some speakers may be 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. Most seminars are advertised outside of TTIC and are intended to be for a broad audience in computer science. In the spring quarter there are a large number of recruiting seminars which are talks given by candidates for faculty positions.

The TTIC Event Calendar can be accessed from the main website: www.ttic.edu
<table>
<thead>
<tr>
<th>Speaker</th>
<th>Institute</th>
<th>Title</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Takeshi Onishi</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Thesis Defense: Relation/Entity-Centric Reading Comprehension</td>
<td>8/4/2020</td>
</tr>
<tr>
<td>Hai Wang</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Thesis Defense: Knowledge Efficient Deep Learning for Natural Language Processing</td>
<td>8/19/2020</td>
</tr>
<tr>
<td>Avrim Blum</td>
<td>Toyota Technological Institute at Chicago</td>
<td>On Learning in the Presence of Biased Data and Strategic Behavior</td>
<td>10/2/2020</td>
</tr>
<tr>
<td>Julia Gaudio</td>
<td>Massachusetts Institute of Technology</td>
<td>IDEAL Seminar: Regression Under Sparsity</td>
<td>10/6/2020</td>
</tr>
<tr>
<td>David McAllester</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Status Report on MathZero --- The Quest for an AlphaZero of Mathematics</td>
<td>10/9/2020</td>
</tr>
<tr>
<td>Daniel Hsu</td>
<td>Columbia Institute of Technology</td>
<td>IDEAL Seminar: Contrastive Learning, Multi-view Redundancy, and Linear Models</td>
<td>10/13/2020</td>
</tr>
<tr>
<td>Quanquan Gu</td>
<td>University of California - Los Angeles</td>
<td>IDEAL Seminar: Learning Wide Neural Networks: Polylogarithmic Over-parameterization and A Mean Field Perspective</td>
<td>10/15/2020</td>
</tr>
<tr>
<td>Matthew Turk</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Beyond Fairness in Face Recognition</td>
<td>10/16/2020</td>
</tr>
<tr>
<td>Anca Dragan</td>
<td>University of California - Berkeley</td>
<td>Colloquium: Getting Human-Robot Interaction Strategies to Emerge from First Principles</td>
<td>10/19/2020</td>
</tr>
<tr>
<td>Nati Srebro</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Toward Understanding Deep Learning, and Whether It's All Just a Big Bad Kernel</td>
<td>10/23/2020</td>
</tr>
<tr>
<td>Francis Bach</td>
<td>INRIA</td>
<td>IDEAL Seminar: On the Convergence of Gradient Descent for Wide Two-Layer Neural Networks</td>
<td>10/29/2020</td>
</tr>
<tr>
<td>Steve Hanneke</td>
<td>Toyota Technological Institute at Chicago</td>
<td>The Sample Complexity of PAC Learning: Optimal Learning, Proper Learning, and Compression Schemes</td>
<td>10/30/2020</td>
</tr>
<tr>
<td>Jeannette Bohg</td>
<td>Stanford University</td>
<td>Colloquium: Scaffolding, Abstraction and Learning from Demonstration - A Route to Robot Learning</td>
<td>11/2/2020</td>
</tr>
<tr>
<td>Sudarshan Babu</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Student Talk: HyperNetworks and their Application to Meta-Learning</td>
<td>11/3/2020</td>
</tr>
<tr>
<td>Matus Telgarsky</td>
<td>University of Illinois at Urbana-Champaign</td>
<td>IDEAL Seminar: The Dual of the Margin: Improved Analyses and Rates of Gradient Descent’s Implicit Bias</td>
<td>11/5/2020</td>
</tr>
<tr>
<td>Audrey Sedal</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Soft Robot Design and Embodied Intelligence</td>
<td>11/6/2020</td>
</tr>
<tr>
<td>Surbhi Goel</td>
<td>Microsoft Research - New York City</td>
<td>IDEAL Seminar: Computational Complexity of Learning Neural Networks over Gaussian Marginals</td>
<td>11/10/2020</td>
</tr>
<tr>
<td>Name</td>
<td>Affiliation</td>
<td>Title</td>
<td>Date</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Thatchaphol Saranurak</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Improved Algorithms for Vertex Connectivity</td>
<td>11/13/2020</td>
</tr>
<tr>
<td>Leila Wehbe</td>
<td>Carnegie Mellon University</td>
<td>From Language Models to Human Brains and Back Again</td>
<td>11/16/2020</td>
</tr>
<tr>
<td>Rayadurgam Srikant</td>
<td>University of Illinois at Urbana-Champaign</td>
<td>IDEAL Seminar: The Role of Explicit Regularization in Overparameterized Neural Networks</td>
<td>11/19/2020</td>
</tr>
<tr>
<td>Danica Sutherland</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Trying to Understand and Improve Deep Learning: When can Uniform Convergence and Invariant Risk Minimization Help?</td>
<td>11/20/2020</td>
</tr>
<tr>
<td>Oriol Vinyals</td>
<td>Google DeepMind</td>
<td>Colloquium: Model-free vs Model-based Reinforcement Learning</td>
<td>11/30/2020</td>
</tr>
<tr>
<td>Edgar Dobriban</td>
<td>University of Pennsylvania</td>
<td>IDEAL Seminar: On the Statistical Foundations of Adversarially Robust Learning</td>
<td>12/1/2020</td>
</tr>
<tr>
<td>Andrea Montanari</td>
<td>Stanford University</td>
<td>IDEAL Seminar: The Generalization Error of Random Feature and Neural Tangent Models</td>
<td>12/3/2020</td>
</tr>
<tr>
<td>Andrew Gordon Wilson</td>
<td>New York University</td>
<td>How Do We Build Models That Learn and Generalize?</td>
<td>12/14/2020</td>
</tr>
<tr>
<td>Frederic Koehler</td>
<td>Massachusetts Institute of Technology</td>
<td>Learning Some Ill-Conditioned Gaussian Graphical Models</td>
<td>1/8/2021</td>
</tr>
<tr>
<td>Sitam Chen</td>
<td>Massachusetts Institute of Technology</td>
<td>Learning When Gradient Descent Fails</td>
<td>1/11/2021</td>
</tr>
<tr>
<td>Soheil Behnezhad</td>
<td>University of Maryland</td>
<td>Recent Advances in Large-Scale Graph Algorithms</td>
<td>1/13/21</td>
</tr>
<tr>
<td>Wenhu Chen</td>
<td>University of California at Santa Barbara</td>
<td>Knowledge-Grounded Natural Language Processing</td>
<td>1/14/21</td>
</tr>
<tr>
<td>Mina Karzand</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Online Learning of Structured Matrices</td>
<td>1/15/21</td>
</tr>
<tr>
<td>David Rosen</td>
<td>Massachusetts Institute of Technology</td>
<td>Provably Sound Perception for Reliable Autonomy</td>
<td>1/20/21</td>
</tr>
<tr>
<td>Najoung Kim</td>
<td>Johns Hopkins University</td>
<td>What Aspects of Meaning are Missing from Current Natural Language Understanding Systems?</td>
<td>1/21/21</td>
</tr>
<tr>
<td>Bradly Stadie</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Thoughts on “The Bitter Lesson.” Scaling Learning and Search in Robotics.</td>
<td>1/22/21</td>
</tr>
<tr>
<td>Percy Liang</td>
<td>Stanford University</td>
<td>Surprises in the Quest for Robust Machine Learning</td>
<td>1/25/21</td>
</tr>
<tr>
<td>Tolga Birdal</td>
<td>Stanford University</td>
<td>Non-Euclidean Machine Learning for 3D Computer Vision</td>
<td>1/26/21</td>
</tr>
<tr>
<td>Melanie Weber</td>
<td>Princeton University</td>
<td>Geometric Methods for Machine Learning and Optimization</td>
<td>1/27/21</td>
</tr>
<tr>
<td>Huda Khayrallah</td>
<td>Johns Hopkins University</td>
<td>Machine Translation for All: Improving Machine Translation in Low Resource, Domain Mismatch, and Low Resource Settings</td>
<td>1/28/21</td>
</tr>
</tbody>
</table>
| Saeed Seddighin       | Toyota Technological Institute at Chicago        | Dynamic Longest Increasing Subsequence and the Erdős-
\{o\}-szekeres Partitioning Problem                                   | 1/29/21    |
<p>| Emily Denton          | Google                                           | Rethinking machine learning data                                    | 2/1/21     |
| Mahsa Derakhshan       | University of Maryland                           | Algorithms for Markets: Matching and Pricing                         | 2/3/21     |</p>
<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Title</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luiz Chamon</td>
<td>University of Pennsylvania</td>
<td>Learning under Requirements</td>
<td>2/4/21</td>
</tr>
<tr>
<td>Greg Shakhnarovich</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Making Do With Few Pixels: Results in Learning Super-Resolution</td>
<td>2/5/21</td>
</tr>
<tr>
<td>Pedro Morgado</td>
<td>University of California, San Diego</td>
<td>Learning to See and Hear from Audio-Visual Co-occurrence</td>
<td>2/8/21</td>
</tr>
<tr>
<td>Stephen Mussmann</td>
<td>Stanford University</td>
<td>Bridging Theory and Practice in Active Learning</td>
<td>2/11/21</td>
</tr>
<tr>
<td>Ian Abraham</td>
<td>Carnegie Mellon University</td>
<td>Runtime Active Learning for Reactive Robotics</td>
<td>2/12/21</td>
</tr>
<tr>
<td>Anton Bankevich</td>
<td>University of California, San Diego</td>
<td>Interpretability and Higher-order Generalization in Deep Learning: Integrated models of Genomics, Evolution and the Brain</td>
<td>2/15/21</td>
</tr>
<tr>
<td>Jonathan Warrell</td>
<td>Yale University</td>
<td>Interpretability and Higher-order Generalization in Deep Learning: Integrated models of Genomics, Evolution and the Brain</td>
<td>2/16/21</td>
</tr>
<tr>
<td>Amirali Aghazadeh</td>
<td>University of California, Berkeley</td>
<td>Inferring Biological Functions with Explainable Algorithms</td>
<td>2/17/21</td>
</tr>
<tr>
<td>Maarten Sap</td>
<td>University of Washington</td>
<td>Positive AI with Social Commonsense Models</td>
<td>2/18/21</td>
</tr>
<tr>
<td>Michael Yu</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Modeling the Language of Microbial Genomes</td>
<td>2/19/21</td>
</tr>
<tr>
<td>Daniel Fried</td>
<td>University of California, Berkeley</td>
<td>Learning Grounded Pragmatic Communication</td>
<td>2/22/21</td>
</tr>
<tr>
<td>Mariya Toneva</td>
<td>Carnegie Mellon University</td>
<td>Data-Driven Transfer of Insight between Brains and AI Systems</td>
<td>2/23/21</td>
</tr>
<tr>
<td>Hongyuan Mei</td>
<td>Johns Hopkins University</td>
<td>Probabilistic Modeling for Event Sequences</td>
<td>2/24/21</td>
</tr>
<tr>
<td>Swabha Swayamdipta</td>
<td>Allen Institute for AI</td>
<td>Addressing Biases for Robust, Generalizable AI</td>
<td>2/25/21</td>
</tr>
<tr>
<td>Nicole Wein</td>
<td>Massachusetts Institute of Technology</td>
<td>Approximating the Diameter of a Graph</td>
<td>2/26/21</td>
</tr>
<tr>
<td>Dylan Foster</td>
<td>Massachusetts Institute of Technology</td>
<td>Bridging Learning and Decision Making</td>
<td>3/1/21</td>
</tr>
<tr>
<td>Kartik Goyal</td>
<td>Carnegie Mellon University</td>
<td>Revisiting Training and Decoding in Neural Sequence Models</td>
<td>3/3/21</td>
</tr>
<tr>
<td>Raymond Yeh</td>
<td>University of Illinois at Urbana-Champaign</td>
<td>Extracting Structures from Data: The Black-Box, the Manual and the Discovered</td>
<td>3/4/21</td>
</tr>
<tr>
<td>Kevin Gimpel</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Natural Language Processing Beyond 512 Tokens</td>
<td>3/5/21</td>
</tr>
<tr>
<td>Aditi Raghunathan</td>
<td>Stanford University</td>
<td>Rethinking the Role of Data in Robust Machine Learning</td>
<td>3/10/21</td>
</tr>
<tr>
<td>Kira Goldner</td>
<td>Columbia University</td>
<td>Mechanism Design for Social Good</td>
<td>3/11/21</td>
</tr>
<tr>
<td>Sam Wiseman</td>
<td>Toyota Technological Institute at Chicago</td>
<td>NLP Structured Prediction with Nearest Neighbors</td>
<td>3/12/21</td>
</tr>
<tr>
<td>Bryan Wilder</td>
<td>Harvard University</td>
<td>AI for Population Health: Melding Data and Algorithms on Networks</td>
<td>3/15/21</td>
</tr>
<tr>
<td>Name</td>
<td>Institution</td>
<td>Title</td>
<td>Date</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Ahmed Abbas</td>
<td>The Jackson Laboratory (JAX)</td>
<td>Integrating Hi-C and FISH data for Modeling of the 3D Organization of Chromosomes</td>
<td>3/17/21</td>
</tr>
<tr>
<td>Lingxiao Wang</td>
<td>University of California, Los Angeles</td>
<td>Towards Efficient and Effective Privacy-Preserving Machine Learning</td>
<td>3/18/21</td>
</tr>
<tr>
<td>Jonathan Frankle</td>
<td>Massachusetts Institute of Technology</td>
<td>The Lottery Ticket Hypothesis: On Sparse, Trainable Neural Networks</td>
<td>3/19/21</td>
</tr>
<tr>
<td>Siddharth Bhandari</td>
<td>Tata Institute of Fundamental Research, India</td>
<td>Sandwich to Sample Exactly</td>
<td>3/24/21</td>
</tr>
<tr>
<td>Wei Hu</td>
<td>Princeton University</td>
<td>Opening the Black Box: Towards Theoretical Understanding of Deep Learning</td>
<td>3/29/21</td>
</tr>
<tr>
<td>Pietro Perona</td>
<td>California Institute of Technology</td>
<td>Distinguished Lecture: A Sense for Number and Quantity as an Emergent Property of a Manipulating Agent</td>
<td>4/15/21</td>
</tr>
<tr>
<td>Matt Walter</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Research at TTIC: No Title</td>
<td>4/16/21</td>
</tr>
<tr>
<td>Arturs Backurs</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Research at TTIC: Faster Kernel Matrix Algebra via Density Estimation</td>
<td>4/23/21</td>
</tr>
<tr>
<td>Brian Bullins</td>
<td>Toyota Technological Institute at Chicago</td>
<td>A Stochastic Newton Algorithm for Distributed Convex Optimization</td>
<td>4/30/21</td>
</tr>
<tr>
<td>Maria Chudnovsky</td>
<td>Princeton University</td>
<td>Distinguished Lecture: Induced Subgraphs and Tree Decompositions</td>
<td>5/5/21</td>
</tr>
<tr>
<td>Julia Chuzhoy</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Decremental All-Pairs Shortest Paths in Deterministic Near-Linear Time</td>
<td>5/7/21</td>
</tr>
<tr>
<td>Ron Dror</td>
<td>Stanford University</td>
<td>Learning and Simulating Atomic-Level Biomolecular Structure</td>
<td>5/10/21</td>
</tr>
<tr>
<td>Blake Woodworth</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Thesis Defense: The Minimax Complexity of Distributed Optimization</td>
<td>5/13/21</td>
</tr>
<tr>
<td>Yury Makarychev</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Kirszbraun theorem, its generalizations and applications</td>
<td>5/14/21</td>
</tr>
<tr>
<td>Derek Reiman</td>
<td>University of Illinois at Chicago</td>
<td>Deep Learning Frameworks for Multi-omics Analyses of the Microbiome in Disease Studies</td>
<td>5/14/21</td>
</tr>
<tr>
<td>Karen Livescu</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Pre-training speech models, from the shallow end to the deep end</td>
<td>5/21/21</td>
</tr>
<tr>
<td>Subhash Khot</td>
<td>New York University</td>
<td>Hardness of Approximation: From the PCP Theorem to the 2-to-2 Games Theorem</td>
<td>5/24/21</td>
</tr>
<tr>
<td>Lifu Tu</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Thesis Defense: Learning Energy-Based Approximate Inference Networks for Structured Applications in NLP</td>
<td>5/27/21</td>
</tr>
<tr>
<td>Madhur Tulsiani</td>
<td>Toyota Technological Institute at Chicago</td>
<td>Constraint Satisfaction and High-Dimensional Expansion: Algorithms and Lower Bounds</td>
<td>6/4/21</td>
</tr>
<tr>
<td>Chenhao Tan</td>
<td>The University of Chicago</td>
<td>Characterizing the “Value” of Information</td>
<td>6/7/21</td>
</tr>
<tr>
<td>Daniela Rus</td>
<td>Massachusetts Institute of Technology</td>
<td>Distinguished Lecture: Learning Risk and Social Behavior in Mixed Human-Autonomous Vehicles Systems</td>
<td>6/14/21</td>
</tr>
</tbody>
</table>
Women in Theoretical Machine Learning Symposium

[Friday, April 9, 2021] TTIC co-sponsored a symposium on women in theoretical machine learning along with the IAS School of Mathematics and the Institute for Mathematical and Statistical Innovation (IMSI).

The goals of this symposium were to encourage collaborations, tighten relationships, and strengthen connections for female researchers in theoretical machine learning, computer science, applied mathematics, and statistical inference.

This event offered an opportunity to enhance professional skills in a friendly environment. Participation was encouraged from graduate students, postdoctoral researchers, professors, and researchers from the industry. As the symposium was held virtually, worldwide participants were welcome.

Speakers included Jelena Diakonikolas (University of Wisconsin - Madison), Stefanie Jegelka (Massachusetts Institute of Technology), Po-Ling Loh (University of Wisconsin - Madison), Caroline Uhler (Massachusetts Institute of Technology), and Rachel Ward (The University of Texas at Austin). The event is being organized by Xiaoxia Wu (TTIC and University of Chicago) and Mina Karzand (TTIC), and advised by Rebecca Willett (University of Chicago).


The Multifaceted Complexity of Machine Learning

[April 12-16, 2021] Modern machine learning methods, coupled with new optimization and statistical inference strategies, have demonstrated an unprecedented potential to solve challenging problems in computer vision, natural language processing, healthcare, agriculture, and other application areas. However, foundational understanding regarding how and when certain methods are adequate to use and most effective in solving tasks of interest is still emerging.

A central question at the heart of this endeavor is to understand the different facets of the complexity of machine learning tasks. These include sample complexity, computational complexity, Kolmogorov complexity, oracle complexity, memory complexity, model complexity, and the stationarity of the learning problem. This workshop will focus on developing a better understanding of these different types of complexity within machine learning, how they can be jointly leveraged to understand the solvability of learning problems, and fundamental trade-offs among them.

Organizers: Avrim Blum (TTIC), Olgica Milenkovic (Electrical and Computer Engineering, University of Illinois at Urbana-Champaign), Lev Reyzin (Mathematics, University of Illinois at Chicago), Matus Telgarsky (Computer Science, University of Illinois at Urbana-Champaign), Rebecca Willett (Statistics and Computer Science, University of Chicago)
New Horizons in Theoretical Computer Science Summer School

[May 31-June 4 2021] New Horizons in Theoretical Computer Science was a week-long online summer school which exposed undergraduates to exciting research in the area of theoretical computer science and its applications. The school contained several mini-courses from top researchers in the field.

The course was free of charge, and welcomed applications from undergraduates majoring in computer science or related fields. Applications were particularly encouraged from students who are members of groups that are currently underrepresented in the field of theoretical computer science.

Organizers: Madhur Tulsiani (TTIC), Boaz Barak (Harvard University), Shuchi Chawla (University of Texas at Austin), the Committee for the Advancement of Theoretical Computer Science (CATCS) of the ACM Special Interest Group on Algorithms and Computation Theory (SIGACT)
Pietro Perona  
*Thursday, April 15, 2021*  
Allen E. Puckett Professor of Electrical Engineering and Computation and Neural Systems, California Institute of Technology  
Director of the National Science Foundation Engineering Research Center in Neuromorphic Systems Engineering, California Institute of Technology  
Talk Title: “A sense for number and quantity as an emergent property of a manipulating agent”

Maria Chudnovsky  
*Wednesday, May 5, 2021*  
Professor, Department of Mathematics, Princeton University  
Talk Title: “Induced Subgraphs and Tree Decompositions”

Daniela Rus  
*Monday, June 14, 2021*  
Director of the MIT Computer Science and Artificial Intelligence Laboratory, Massachusetts Institute of Technology  
Andrew and Erna Viterbi Professor in the Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology  
Talk Title: “Learning Risk and Social Behavior in Mixed Human-Autonomous Vehicles Systems”
Education

The PhD Program

The TTIC PhD Program is designed to prepare students for modern academic or research careers in computer science. To complete the program, a student must make an original and significant contribution to the field of computer science, conducting high-level, responsible, and original research that culminates in a doctoral thesis which can be successfully defended in a public forum and published. In addition to the thesis, there are course, experiential, and examination requirements to complete the program. The main component of the program is the process by which the student learns to do quality 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 and receive credit for courses through the University of Chicago, and University of Chicago students can take advantage of classes that TTIC offers as well. Students of both institutions have taken full advantage of this opportunity. TTIC students also have full access to the University of Chicago library system, athletic facilities, the student health center, and transportation on campus. TTIC students enjoy the benefits and great rewards of an intimate learning, study, and research setting, exposure to state-of-the-art research, opportunities in the greater computer science community, and still maintain the traditional shared experiences that come with a large university.

Graduates, Diplomas, and Awards

A global pandemic and remote operations did not deter TTIC from celebrating the accomplishments of its students. TTIC awarded 3 doctoral diplomas at the first-ever virtual diploma ceremony in September 2020 to:

- Takeshi Onishi, who studied under Professor David McAllester, with research interests in machine learning and natural language processing. Takeshi is currently employed by Toyota Motor Corporation.
- Siqi Sun, who studied under Professor Jinbo Xu, with research interests in machine learning, mathematical modeling, and its application in bioinformatics. Siqi is currently employed as a Researcher at Microsoft.
- Hai Wang, who studied under Professor David McAllester, with research interests in large-scale machine learning, deep learning and optimization. Hai is currently employed by JD.com at Mountain View.

TTIC expects four PhD Candidates to be eligible for doctoral degrees in the September 2021 diploma ceremony.

Students Freda Shi, Ziwei Xie, Jiading Fang, Takuma Yoneda, Xiao Luo, Ben Lai, and Shashank Srivastava successfully fulfilled all requirements to complete the Master’s portion of the PhD Program, and received master’s diplomas from the institute at the September 2020 virtual diploma ceremony at the start of the academic year.

The remote format of the ceremony allowed TTIC to secure some meaningful speakers for the occasion. Trustee Dr. Charles Isbell, also Professor and Dean at Georgia Institute of Technology College of Computing gave the convocation opening address. TTIC Alumnus Dr. Behnam Neyshabur gave a second address.
Ankita Pasad was awarded the 2020 Outstanding Teaching Assistant Award at the ceremony, for her exceptional dedication to the course TTIC 31110 Speech Technologies (taught by Professor Karen Livescu in Spring Quarter 2020). The annual award was created in 2019 to recognize outstanding performance of teaching assistants (TAs) of courses at the Toyota Technological Institute at Chicago. Students enrolled in TTIC courses may nominate the course TA(s) for the award throughout the academic year. An award committee reviews nominations and selects a winner. A TA Award plaque displays the names of award recipients.
Quality Curriculum

TTIC instructors serve the TTIC student population in their courses, and under the TTIC-University of Chicago Agreement, University students may enroll in TTIC’s courses and receive credit through the University, and vice-versa. TTIC views this as part of serving the Education Mission of the Institute. The amount of University students who register for TTIC courses continues to increase.

TTIC instructors are proud to offer a quality curriculum and rigorous courses to institute PhD students and the students from the University who take part. The increase in course enrollments, and with that, course delivery demands, was a consideration in TTIC’s recently completed facility renovation and expansion.

Enrollment Numbers for TTIC Courses

Financial Support for Students

Full financial support is offered to all enrolled students in good academic standing, in residence, and making progress in the program, guaranteed for up to five years.

The tuition for an academic year is $30,000. All students at TTIC may expect to receive financial support that covers tuition, health services, health insurance and student services fees, a new student equipment allowance, and a stipend paid for research assistance, provided they remain full-time and in good academic standing.
TTIC moved from fully in-person to fully remote operation in March 2020 due to the escalating public health risk inflicted by the COVID-19 global pandemic, and mitigation restrictions from the City of Chicago and State of Illinois. For the safety of the TTIC community, operations remained remote to begin the 2020-21 academic year.

Returning students and faculty demonstrated a dedication and commitment to pursuing study and research. Students moved forward with courses, qualifying exams, thesis proposals and remote internships throughout the academic year. Faculty found ways to encourage students whether it was via online meetings and course instruction, or advising sessions outdoors at a picnic table on campus.

Four ambitious new students matriculated to the PhD program in autumn 2020 and began their studies remotely. These students navigated a new PhD program, connected with new advisors, instructors and the TTIC community and met the challenges of this time. We look forward to welcoming them in-person in the coming year, along with the additional three students who were accepted for autumn 2020 matriculation but had to defer enrollment to autumn 2021 due to travel restrictions, high infection rates and closed embassies around the world.

Remote course delivery did not deter Research Assistant Professor Dr. Sepideh Mahabadi from moving ahead with her new course in the spring quarter 2021, Special Topics: Algorithms for Massive Data. Students found this new course valuable and course evaluation comments included: “the course helped me find research directions that I want to pursue this summer and maybe later in life too. Also, the topics were modern.” and, “The material was really interesting. The lectures were illuminating.” We are grateful to Dr. Mahabadi for choosing to move ahead with this quality course despite the added challenge of remote format.

In the spring of 2021, vaccines became generally accessible to most adults in the U.S. and it was after this that TTIC’s COVID-19 Response Group arranged protocols and safety measures which allowed members of the TTIC community increased access to the facilities and the capability to opt-in to some in-person activities.

TTIC’s PhD program is an in-person, in-residence program, and the institute aims to return to that format as soon as it is safe to do so, with our eyes on autumn 2021. TTIC continues to be encouraged by the persistence with which students continue to produce great work, make progress, and move towards degree completion. We are grateful to the faculty and staff who support the institute’s mission and these students.
In Spring Quarter 2021, Research Assistant Prof. Sepideh Mahabadi taught a new course, “Special Topics: Algorithms for Massive Data.” This course covered the theoretical aspects of computation over massive data.

While classical algorithms can be too slow, or require too much space on big data, in this course students focused on designing algorithms that are specifically tailored for large datasets. Moreover, they learned about different computational models that capture various aspects of computation over massive data, such as streaming algorithms and sub-linear time algorithms.

The course will also offer some of the algorithmic techniques and tools for solving problems over massive data, such as sampling, sketching, dimensionality reduction, and computing efficient summaries of the data (such as core-sets).

“I decided to teach this course to provide an opportunity for interested students to become familiar with the area of algorithms for big data, use the techniques developed in the course in other areas, be able to read recent papers in the area, and ideally start conducting research in this area,” said Mahabadi.

In Spring Quarter 2021, Prof. Greg Shakhnarovich taught “Introduction to Computer Vision,” an original course serving as an introduction to the principles and practice of computer vision, providing an in-depth survey of topics involved in major tasks in modern vision, and offering hands-on experience in implementing some of these principles.

Topics covered by this course included image formation, representation, and compression, representation and perception of color, filtering and edge detection, image features, detectors, and interest point operators, model fitting, RANSAC and Hough transform, stereo and multi-view geometry, and camera calibration among other areas.

Students gained familiarity with models for image formation and image analysis, major methods for image processing, alignment, matching, knowledge of principles and methods of 3D reconstruction from images and videos, and the ability to build and diagnose implementations of these methods. They also obtained an understanding of modern methods for object and scene categorization from images, and ability to build and diagnose implementations of such methods.
Student Publications, Posters, and Abstracts


In the fall of 2004, TTIC matriculated its first three students. The 2020-21 academic year began with 43 students, 4 who enrolled as first time new students for Autumn 2020.
Fiscal year 2020-2021 mirrored the previous fiscal year – remote operations while progressing our growth related to infrastructure and financial assets. Like the previous fiscal year, TTIC did not experience adverse fiscal repercussions from another year at the mercy of the global pandemic.

In the fall of 2020, we completed renovation of space leased from University of Chicago, including the newly leased 5,000 sq feet. The renovation project was completed under budget, and the overall feedback from the community has been positive. As a result of the renovation, TTIC has updated classrooms, conference rooms, and collaboration spaces with upgraded AV capabilities. There is enough workspace to meet the future planned growth in addition to a remodeled café space. The Robotics Lab also significantly increased in size and was outfitted to support the needs of the Robotics faculty and students.

In November 2020, the Board of Trustees adopted a new Investment Policy Statement (IPS). The IPS outlines the investment policy, strategy, and asset allocation necessary to meet TTIC’s operating needs as it continues to grow while maintaining a tolerable level of risk. The implementation of the new asset allocation began in early 2021, and it mostly complete by the end of the fiscal year. As a result of the asset allocation restructuring, TTIC’s investment portfolio is currently managed by two different investment managers, University of Chicago and Aon Investments, each managing approximately half of the investable assets.

TTIC’s investment portfolio experienced extraordinary capital growth in this fiscal year, specifically related to TTIC’s investments University of Chicago’s Total Return Investment Pool (TRIP). All asset classes performed well but alternative investments residing in the TRIP fund performed exceptionally well.
Operating Results

30% of TTIC’s operating revenue is derived from external grants. TTIC’s research was able to continue remotely, so there was no impact on grant revenue due to COVID-19. Except for tuition paid by UChicago, the remainder of TTIC’s operating revenue is the distribution of investment return, which to date, has not been significantly impacted by COVID-19. Overall, operating revenue was close to budget at just over $11 mil.

Regarding operating expense, TTIC continues to operate remotely so there is less spending on travel and events-related expenses. TTIC continued paying a monthly telecommunication stipend of $100 for the entire community to facilitate remote work. Overall, TTIC ended the fiscal year with an operating surplus of over $700,000.

TTIC is fortunate to be in a strong financial position with approximately $75 mil in unrestricted financial assets. Not only is TTIC poised to successfully navigate the challenges of the global pandemic, but we are also in a strong financial position to continue our growth plan.

In conclusion, I would like to thank the TTIC administrative staff for their hard work, commitment, and teamwork. I am looking forward to returning from remote operations to a newly renovated campus – and celebrating with the entire TTIC Community!

Jessica Jacobson
Chief Financial Officer
### Financial Reports

**Toyota Technological Institute at Chicago**

**Statement of Financial Position**

June 30, 2021 and 2020

<table>
<thead>
<tr>
<th></th>
<th>2021</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current Assets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and cash equivalents</td>
<td>$1,481,352</td>
<td>$13,901,797</td>
</tr>
<tr>
<td>Receivables:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miscellaneous receivable</td>
<td>526,684</td>
<td>85,165</td>
</tr>
<tr>
<td>Grants receivable</td>
<td>926,273</td>
<td>737,034</td>
</tr>
<tr>
<td>Due from TTI (Note 9)</td>
<td>1,646</td>
<td>1,299</td>
</tr>
<tr>
<td>Interest receivable</td>
<td>43,426</td>
<td>1,169,499</td>
</tr>
<tr>
<td>Investment distribution receivable</td>
<td>5,462,834</td>
<td>4,089,694</td>
</tr>
<tr>
<td>Prepaid expenses and other current assets</td>
<td>34,898</td>
<td>330,690</td>
</tr>
<tr>
<td><strong>Investments</strong></td>
<td>287,565,842</td>
<td>243,833,782</td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td>$302,171,047</td>
<td>$270,979,400</td>
</tr>
<tr>
<td><strong>Liabilities and Net Assets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current Liabilities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts payable</td>
<td>$326,826</td>
<td>$125,888</td>
</tr>
<tr>
<td>Accrued expenses</td>
<td>820,480</td>
<td>917,640</td>
</tr>
<tr>
<td>Accrued lease liability (Note 7)</td>
<td>288,057</td>
<td>284,191</td>
</tr>
<tr>
<td><strong>Total liabilities</strong></td>
<td>1,435,363</td>
<td>1,327,719</td>
</tr>
<tr>
<td><strong>Net Assets</strong> (Note 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without donor restrictions</td>
<td>74,717,884</td>
<td>67,932,936</td>
</tr>
<tr>
<td>With donor restrictions</td>
<td>226,017,800</td>
<td>201,718,745</td>
</tr>
<tr>
<td><strong>Total net assets</strong></td>
<td>300,735,684</td>
<td>269,651,681</td>
</tr>
<tr>
<td><strong>Total liabilities and net assets</strong></td>
<td>$302,171,047</td>
<td>$270,979,400</td>
</tr>
</tbody>
</table>

See notes to financial statements.
## Toyota Technological Institute at Chicago

### Statement of Activities and Changes in Net Assets

**Years Ended June 30, 2021 and 2020**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue, Gains, and Other Support</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student tuition and fees:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$1,355,414</td>
<td>$</td>
<td>$1,355,414</td>
<td>$1,357,088</td>
<td>$</td>
<td>$1,357,088</td>
</tr>
<tr>
<td>Scholarships</td>
<td>(1,320,000)</td>
<td>-</td>
<td>(1,320,000)</td>
<td>(1,290,000)</td>
<td>-</td>
<td>(1,290,000)</td>
</tr>
<tr>
<td>Total net student tuition and fees</td>
<td>35,414</td>
<td>-</td>
<td>35,414</td>
<td>67,088</td>
<td>-</td>
<td>67,088</td>
</tr>
<tr>
<td>Federal grants and contracts</td>
<td>3,625,811</td>
<td>-</td>
<td>3,625,811</td>
<td>4,374,202</td>
<td>-</td>
<td>4,374,202</td>
</tr>
<tr>
<td>Other interest</td>
<td>14,213</td>
<td>-</td>
<td>14,213</td>
<td>93,657</td>
<td>-</td>
<td>93,657</td>
</tr>
<tr>
<td>Net realized and unrealized gains on investments</td>
<td>7,822,800</td>
<td>27,931,091</td>
<td>35,753,891</td>
<td>1,807,887</td>
<td>5,822,489</td>
<td>7,630,376</td>
</tr>
<tr>
<td>Investment income (loss) - Net of investment fees</td>
<td>363,713</td>
<td>2,480,314</td>
<td>2,844,027</td>
<td>(245,637)</td>
<td>4,552,517</td>
<td>4,306,880</td>
</tr>
<tr>
<td>Net assets released from restrictions</td>
<td>6,112,350</td>
<td>(6,112,350)</td>
<td>-</td>
<td>7,244,282</td>
<td>(7,244,282)</td>
<td>-</td>
</tr>
<tr>
<td>Total revenue, gains, and other support</td>
<td>17,974,301</td>
<td>24,299,055</td>
<td>42,273,356</td>
<td>13,341,479</td>
<td>3,130,724</td>
<td>16,472,203</td>
</tr>
<tr>
<td><strong>Expenses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education and research expenses - Instruction</td>
<td>8,863,900</td>
<td>-</td>
<td>8,863,900</td>
<td>8,226,644</td>
<td>-</td>
<td>8,226,644</td>
</tr>
<tr>
<td>Management and general expenses - Institutional support</td>
<td>2,325,453</td>
<td>-</td>
<td>2,325,453</td>
<td>2,453,925</td>
<td>-</td>
<td>2,453,925</td>
</tr>
<tr>
<td>Total expenses</td>
<td>11,189,353</td>
<td>-</td>
<td>11,189,353</td>
<td>10,680,569</td>
<td>-</td>
<td>10,680,569</td>
</tr>
<tr>
<td><strong>Increase in Net Assets</strong></td>
<td>6,784,948</td>
<td>24,299,055</td>
<td>31,084,003</td>
<td>2,660,910</td>
<td>3,130,724</td>
<td>5,791,634</td>
</tr>
<tr>
<td><strong>Net Assets - Beginning of year</strong></td>
<td>67,932,936</td>
<td>201,718,745</td>
<td>269,651,681</td>
<td>65,272,026</td>
<td>198,588,021</td>
<td>263,860,047</td>
</tr>
<tr>
<td><strong>Net Assets - End of year</strong></td>
<td>$74,717,884</td>
<td>$226,017,800</td>
<td>$300,735,684</td>
<td>$67,932,936</td>
<td>$201,718,745</td>
<td>$269,651,681</td>
</tr>
</tbody>
</table>
TTIC maintains a steady number of interns and visiting scholars who engage in study and research on the premises. Summer 2020 had eighteen visiting scholars from other institutions in the U.S. and abroad who came to the Institute to work on research projects in collaboration with TTIC faculty and students. Due to pandemic travel restrictions and closed campus, TTIC faculty could only offer remote engagement for interns over the summer 2020.

Short-term visiting scholars bring interest, energy, and enthusiasm to our academic community, and allow TTIC students access to a broad range of specialties that outside researchers bring with them, along with ideas and culture brought from the visitors’ home institutions. TTIC hopes to be back to the usual intern/visiting scholar program in the summer of 2021.

**Ahmadi, Saba**  
University of Maryland  
Faculty Host: Avrim Blum

**Behnezhad, Soheil**  
University of Maryland  
Faculty Host: Avrim Blum

**Carlson, Charles**  
University of Colorado, Boulder  
Faculty Host: Yury Makharychev

**Derakhshan, Mahsa**  
University of Maryland  
Faculty Host: Avrim Blum

**Ge, Ruiquan**  
Hangzhou Dianzi University of Technology  
Faculty Host: Jinbo Xu

**Granha, Fernando Jeronimo**  
University of Chicago  
Faculty Host: Madhur Tulsiani

**Hou, Yifan**  
The Chinese University of Hong Kong  
Faculty Host: Mrinmaya Sachan

**Jafarov, Jafar**  
University of Chicago  
Faculty Host: Yury Makharychev

**Kim, Suhyoung (Sunnie)**  
Princeton University  
Faculty Host: Greg Shakhnarovich

**Li, Jin Jun**  
University of Chicago  
Faculty Host: Jinbo Xu

**Liu, Qingyuan**  
University of Michigan  
Faculty Host: Jinbo Xu

**Liu, Zhuoran (Oliver)**  
Northwestern University  
Faculty Host: Sam Wiseman

**MacKeith, Arthur**  
University of Chicago  
Faculty Host: Matt Walter

**Qing, Yutong (Tony)**  
Faculty Host: Audrey Sedal

**Rogers, Marianna**  
Faculty Host: Audrey Sedal

**Saleh, Hamed**  
University of Maryland  
Faculty Host: Saeed Seddighin

**Schondorf, Ethan**  
Faculty Hosts: Audrey Sedal and Matt Walter

**Wu, Fandi**  
Institute of Computing Technology  
Chinese Academy of Sciences  
Faculty Host: Jinbo Xu
Community Outreach

Addressing Violence Against People of Asian Descent

On March 18, 2021 President Turk released a statement to the TTIC community regarding the recent surge in violence against people of Asian descent. Amplifying the words of the University of Chicago’s Provost Ka Yee C. Lee, and Dean of Students Michele Rasmussen, President Turk shared the following via email:

TTIC stands firmly with UChicago in opposing all bias, racism, and acts of hate and violence. The surge in anti-Asian rhetoric, discrimination, and violence in this country is extremely disturbing. The murders in the Atlanta area were a shock to us all.

To those in the TTIC community who are Asian or of Asian descent, you are integral to TTIC, as our colleagues, students, teachers, leaders, and friends. We value and appreciate you. TTIC stands in solidarity with you.

To all, please consider taking advantage of campus resources if you have experienced bias, feel threatened in any way, or want to seek or offer support. Additionally, don’t hesitate to contact HR Director Amy Minick or myself if you’d like to discuss any issues related to your safety or well-being at TTIC or our commitments to equity and inclusion.

Institute Donation to India in Crisis

Philanthropic giving is something very close to the hearts of many TTIC community members. This year when pandemic emergency hit India with alarming impact, the TTIC community chose to help communities in India that have been adversely affected by the ongoing global pandemic. The institute has always had deep academic and social ties to Indian nationals and friends and in this case, the ability to offer aid in this crisis was personal.

The TTIC community collectively donated $1,330 to the Indian Red Cross Society, and the Institute matched with a gift of $780. The total donation was $2,110. $125 was also donated to MilaapWeHopeWeCare’s campaign to support a community in India that was hit especially hard by the pandemic.
Promoting Diversity, Equity, and Inclusion

The new Diversity, Equity, and Inclusion (DEI) Committee at TTIC was created in August 2020, and has already become very active. The committee consistently seeks out new opportunities to educate our students, faculty, and staff and make TTIC a more inclusive and welcoming place.

In August 2020, the DEI committee conducted a Community Discussion on Diversity survey to gauge attitudes of the TTIC community. In September 2020, they held the TTIC Community Discussion on Diversity, and most attendees thought that TTIC should make attempts to increase diversity.

In October 2020, the TTIC Diversity Values Statement was published, and the faculty hiring and student recruitment processes were reviewed. Among the potential issues identified were the need for improved recruiting and outreach to underrepresented populations, and the potential for unchecked bias affecting the process.

In January 2021, co-chairs Professor Greg Shakhnarovich and Manager of Research Administration Rose Bradford met with University of Chicago leadership to discuss how to better take advantage of their diversity resources.

The DEI committee is composed of students, faculty, and staff members, and welcomes feedback and participation from all members of the TTIC community.

Diversity, Equity, and Inclusion Committee

Rose Bradford, Manager of Research Administration (Co-Chair)
Greg Shakhnarovich, Professor (Co-Chair)
Erica Cocom, Student Services and Admissions Administrator
Lingyu Gao, Student
Sepideh Mahabadi, Research Assistant Professor
David Yunis, Student
Governance

Board of Trustees

Kavita Bala
Dean, Ann S. Bowers College of Computing and Information Science, Cornell University
Professor, Cornell University
Co-Founder, GrokStyle
Faculty Fellow, Atkinson Center for a Sustainable Future
Trustee since May 2021

Robert Barnett
Partner, Williams & Connolly LLP
Ranked Number One, Washingtonian Magazine’s list of “Washington’s Best Lawyers.”
Executive Committee Member, Williams & Connelly LLP
Senior Counsel, Board of Trustees of the John F. Kennedy Center for the Performing Arts.
(President-appointed member.)
Trustee since April 2006

Juan de Pablo
Vice President for National Laboratories, Science Strategy, Innovation, and Global Initiatives, University of Chicago
Liew Family Professor in Molecular Engineering, University of Chicago
Senior Scientist, Argonne National Laboratory
Member, National Academy of Engineering (NAE)
Trustee since May 2021

Sadaoki Furui
Chair, Board of Trustees, Toyota Technological Institute at Chicago
Former President, Toyota Technological Institute at Chicago
Professor Emeritus, Tokyo Institute of Technology
Former Director of University Library, Tokyo Institute of Technology
Former Dean of Graduate School of Information Science and Engineering, Tokyo Institute of Technology
Former Director of Furui Research Laboratory, NTT Human Interface Laboratories, Japan
Trustee since April 2013, Chair from July 2019 - May 2021

Eric Grimson
Chancellor for Academic Advancement, Massachusetts Institute of Technology
Bernard Gordon Chair of Medical Engineering at MIT
Lecturer on Radiology at Harvard Medical School and at Brigham and Women’s Hospital
Former Education Officer for the Dept. of Electrical Engineering and Computer Science at MIT; Associate Department Head; Head of the Dept. of Electrical Engineering and Computer Science.
Trustee since July 2015, Chair from May 2021
Alexis Herman
Chair and Chief Executive Officer, New Ventures, LLC
Appointed by President Jimmy Carter, became the youngest director of the Women’s Bureau in the history of the Labor Department
US 23rd Secretary of Labor and first African American to lead the US Department of Labor
Former member of the National Economic Council
Serves on the boards of: Cummins Inc., Entergy Inc., MGM Mirage, Coca-Cola Company
Former chairwoman of the Coca-Cola Company’s Human Resources Task Force
Board member of the Clinton Bush Haiti Fund
Trustee since October 2012

Kazuo Hotate
President, Toyota Technological Institute (Nagoya, Japan)
Member, Science Council of Japan (SCJ)
Member, Institute of Electrical and Electronics Engineers (IEEE)
Member, Japan Society of Applied Physics (JSAP)
Trustee since May 2021

Charles Isbell, Jr.
Professor, Executive Associate Dean, College of Computing,
Georgia Institute of Technology
Oversaw Georgia Tech’s rollout of online Computer Science Master’s degree, studied by Harvard economists and published in the New York Times, as a whole new way of thinking about the cost of higher education
Work has been featured in the New York Times and the Washington Post
Trustee since April 2018

Noboru Kikuchi
President, Toyota Central R&D Labs, Inc.
Professor Emeritus, Mechanical Engineering, University of Michigan
Roger L. McCarthy Professor Emeritus of Mechanical Engineering, University of Michigan
A Member of National Academy of Engineering, USA
Design and System Engineering Achievement Award, The Japan Society of Mechanical Engineers
Computational Mechanics Achievements Award, The Japan Society of Mechanical Engineers
Excellence in Research Award, Dept of Mechanical Engineering and Applied Mechanics, The University of Michigan
Distinguished Research Award, College of Engineering, University of Michigan
Trustee since May 2019
Yoshihiko Masuda
Chairman of the Board of Trustees, Toyota School Foundation
Advisor, Toyota Central R&D Labs, Inc. and Toyota Motor
Chairman of Toyota Central R&D Labs, Inc., 2014-2017
Member of Representatives, Society of Automotive Engineers of Japan, Inc., 2009-2011
Member of Councils, Toyota School Foundation, 2011- current
Member of Japan Techno-Economics Society Board of Trustees, 2017- current
Recipient of Society of Automotive Engineers (SAE) Fuel and Lubricant Paper Award (1997) and JSAE Technological Contribution Award (2017)
*Trustee since October 2017*

Angela Olinto
Dean of the Physical Sciences Division, University of Chicago
Albert A. Michelson Distinguished Service Professor, Department of Astronomy and Astrophysics; Enrico Fermi Institute; and the College, University of Chicago
Principal Investigator of the POEMMA (Probe of Extreme Multi-Messenger Astrophysics) space mission
Member of the Pierre Auger Observatory
Fellow, American Physical Society and the American Association for the Advancement of Science
Received the Chaire d’Excellence Award of the French Agence Nationale de Recherche, 2006
Received the Llewellyn John and Harriet Manchester Quantrell Award for Excellence in Undergrad Teaching, 2001
Received the Faculty Award for Excellence in Graduate Teaching, University of Chicago, 2015
*Trustee since October 2018*

Nuria Oliver
Chief Scientific Advisor, Vodafone Institute
Chief Data Scientist, DataPop Alliance
Independent Director, Board of Directors, Bankia
Commissioner for AI and COVID-19, Presidency of Valencia
Founder, ELLIS Alicante Foundation
*Trustee since November 2020*

Mari Ostendorf
Endowed Professor of System Design Methodologies and Associate Vice Provost for Research, University of Washington
Has worked for AT&T Bell Laboratories, BBN Laboratories and Boston University
Adjunct Professor in Linguistics and Computer Science and Engineering and served as Associate Dean for Research and Graduate Studies in the College of Engineering, 2009-2012
Scottish Informatics and Computer Science Alliance Distinguished Visiting Fellow
Australia Fulbright Scholar at Macquarie University
Has had 260 publications and recipient of two paper awards, the 2010 IEEE HP Harriett B. Rigas Award, and the 2018 IEEE James L. Flanagan Speech and Audio Processing Award
Served as Editor of IEEE Transactions on Audio, Speech and Language Processing and Computer Speech and Language, as VP Publications on IEEE Signal Processing Society, and served as a member of the IEEE Periodicals Review and Advisory Committee Fellow of IEEE and ISCA and a 2013-2014 IEEE Signal Processing Society Distinguished Lecturer
*Trustee since October 2017*
Hiroyuki Sakaki
Former President, Toyota Technological Institute
Appointed as an associate professor in 1973 at the Institute of Industrial Science, University of Tokyo, promoted to full professor in 1987, and engaged in R&D and education in the area of semiconductor electronics.
Professor Emeritus in 2007
Appointed as Vice President of Toyota Technological Institute (Nagoya, Japan) in 2007 and promoted to President in 2010
Awarded the National Recognition as a Person of Cultural Merit, Japan Academy Award, Leo Esaki Award, Heinrich Welker Award, Medal of Purple Ribbon from the Emperor of Japan, IEEE David Sarnoff Award, Fujiwara Prize, Japan IBM Science Award, and the Hattori-Hoko Award
Trustee since October 2010

Ivan Samstein
Vice President and Chief Financial Officer, University of Chicago
Former Director of public finance department, Bank of America Merrill Lynch, 2004-2011; Assistant Vice President of public finance, Moody’s Investors Service, 1999-2004
Former Chief Financial Officer for Cook County, 2012-2016
Had primary responsibility for budget, capital and debt structure for second-largest county government and associated health system in the country
Designed and led several transformative projects in financial operations, technology, program-based budgeting and performance metric-driven management
Leads integrated strategic financial planning and oversight for the execution of the University’s work in financial analysis and functions, information technology and human resources
Trustee since April 2018

Balaji Srinivasan
Executive Vice President for Science, Innovation, and Strategy, University of Chicago
Deputy Provost, University of Chicago
Chief International Officer, University of Chicago
Former managing director of Och Ziff Capital Management (India and Hong Kong)
Former executive director of Goldman Sachs Hong Kong
Former associate director of Jardine Fleming (Singapore, Hong Kong, and Mumbai)
Trustee since July 2019

Masatami Takimoto
Former Chair, Board of Trustees, Toyota Technological Institute at Chicago
Former Chair, Board of Directors & the Board of Trustees, Toyota School Foundation
Special Advisor, Toyota Central R&D Labs., INC.
Former Executive Vice President, Toyota Motor Corporation
Trustee since October 2011

Matthew Turk
President, Toyota Technological Institute at Chicago
Professor Emeritus, University of California, Santa Barbara
Former professor and dept. Chair, Department of Computer Science and Media Arts and Technology, UC Santa Barbara
Co-founder, Vision Technology Group at Microsoft Research
Fellow of the IEEE and the IAPR
Former Fulbright-Nokia Distinguished Chair in Information and Communications Technologies
Trustee since July 2019
Tatsuro Toyoda | Chair Emeritus

Mark Hogan (Advisor to the Board)
Director, Toyota Motor Corporation
President, Dewey Investments, LLC

---

**Trustee Departures:**
Dr. Sadaoki Furui (April 2013 - May 2021)
Dr. Balaji Srinivasan (July 2019 - November 2020)
Dr. Masatami Takimoto (October 2011 - November 2020)

**Trustee Appointments:**
Dr. Nuria Oliver (November 2020)
Dr. Kavita Bala (May 2021)
Dr. Juan de Pablo (May 2021)
Dr. Kazuo Hotate (May 2021)

**New Board Chair:**
Dr. Eric Grimson (Appointed May 2021)
Leadership

Matthew Turk, President
Jessica Jacobson, Chief Financial Officer
Chrissy M. Coleman, Secretary of the Institute
Avrim Blum, Chief Academic Officer

Administration

Adam Bohlander, Director of Information Technology
Rose Bradford, Manager of Research Administration
Liz Clay, Communications Administrator
Erica Cocom, Student Services and Admissions Administrator
Chrissy Coleman, Administrative Director of Graduate Studies and Publications,
   Accreditation Liaison Officer, Deputy Title IX Coordinator
Jessica Jacobson, Chief Financial Officer and Director of Operations
Deree Kobets, Controller
Mary Marre, Administrative Assistant
Alicia McClarin, Office Manager
Amy Minick, Director of Human Resources and International Affairs,
   Title IX Coordinator

Non-Discrimination Statement

TTIC is committed to providing a respectful and positive environment for all members of its community, free from all forms of discrimination and harassment.
Special Thanks

External Advisory Committee
Eric Grimson, Chancellor for Academic Advancement and Professor of Computer Science and Engineering, Massachusetts Institute of Technology
Takeo Kanade, UA and Helen Whitaker University Professor, Robotics Institute, Carnegie Mellon University
Richard Karp, Professor Emeritus, Electrical Engineering and Computer Science, University of California, Berkeley
Éva Tardos, Jacob Gould Schurman Professor of Computer Science, Cornell University

The professionals at the Higher Learning Commission

Toyota Motor Corporation

Toyota Technological Institute (Nagoya, Japan)
University of Chicago greater community
Booth School of Business
Department of Computer Science
Department of Mathematics
Department of Statistics
English Language Institute
Faculty and Administration of the Division of Physical Sciences
Office of the Bursar
Office of International Affairs
Office of Investments
Office of the Provost
Office of the Registrar
Staff of the Regenstein and Eckhart Libraries
Student Wellness Services
Facilities Services
University Research Administration
University IT Services
The professionals at the 6045 S. Kenwood Avenue building