COMPUTING NEWS



Computing Research Association
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CRA Update: Taulbee Survey Shows Record Number of Graduates and Strong Enrollment at All Degree Levels

The highly anticipated 53rd annual Taulbee Survey is here! This year's report boasts positive trends in student enrollment, degree production, employment of graduates, faculty salaries, and continued productivity among doctoral-granting departments.

Read more on page 2

Congress Meets Robots: CRA Co-hosts Senate Robotics Showcase and Demo Day

The Senate Robotics Showcase and Demo Day highlighted groundbreaking technologies and featured demonstrations from leading research institutions, providing lawmakers with insights into the impact of these innovations, especially as they integrate with AI.

Read more on page 4

Our Favorite Pics From Grad Cohort for IDEALS and Grad Cohort for Women 2024

CRA-WP welcomed over 350 attendees and speakers for the co-located 2024 Grad Cohort event, including two plenary talks, insightful discussions, and CRA-WP's first social media competition.

Read more on page 5



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CRA Update: Taulbee Survey Shows Record Number of Graduates and Strong Enrollment at All Degree Levels



By Matt Hazenbush, Director of Communications, and the CRA Taulbee Survey Team

The Computing Research Association (CRA) is pleased to present the findings of the 53rd annual CRA Taulbee Survey. A widely known and trusted resource in the computing research community, this year's survey report documents trends in student enrollment, degree production, employment of graduates, and faculty salaries in academic units in the United States and Canada that grant PhDs in computer science (CS), computer engineering (CE), or information (I).

View the Report

The results of this year's survey indicate continued strong productivity among doctoral-granting departments. The number of graduates at each degree level was at an all-time high in 2022-23 and, for the most part, overall enrollment in the programs showed increases.

Among U.S. CS institutions, average bachelor's enrollment in the departments has now been increasing for 16 consecutive years. The departments continue to hire many new teaching faculty to help keep pace with the enrollment growth, though tenure track faculty size also increased somewhat.

Trends in Computer Science, Computing Engineering, and Information Departments Doctoral Programs

- This year's respondents reported another all-time high doctoral degree production, breaking the 2021-22 record by 3.2 percent. Among all
 departments reporting both this year and last year, the number of total doctoral degrees increased by 0.8 percent.
- Among 2022-23 PhD recipients aggregated across CS, CE, and I, 24.1 percent identified as female, up from 22.9 percent in 2021-22. Among CS programs that reported doctoral degrees by race/ethnicity, the distribution is similar to that reported for 2021-22.
- Total doctoral enrollment increased this year by 4.7 percent across all responding departments, and increased 3.0 percent among departments reporting both this year and last year.
- The share of females among enrolled doctoral students of known gender rose for the eighth straight year, from 26.1 percent to 26.3 percent across the three areas of CS, CE and I combined. Among those students whose race/ethnicity is known, the overall percentage of doctoral students who were neither Non-resident Aliens, Asian, nor White was 5.6 percent; this is little changed from the 5.7 percent reported last year.
- Among the new 2022-23 PhDs for whom employment information was known, the percentage who took positions in North American industry
 in 2023-24 was 57.5 percent, down from the near record 62.5 percent reported last year for the new 2021-22 PhDs. Conversely, the percentage
 who took North American academic jobs was 30.6, considerably higher than last year's reported record low of 25.8 percent.
- Artificial intelligence/machine learning continues to be by far the most popular area of specialty of new PhDs, comprising more than a quarter of all doctoral degrees awarded for which the area was known.

Master's Programs

- Overall master's degree production ballooned in 2022-23, a natural result of the two consecutive years of post-COVID large increases in total master's enrollment reported in the previous two Taulbee surveys. Both the total number of master's degrees produced and the average per reporting department are more than double those from last year's report and are the largest reported master's production levels in the history of the Taulbee Survey.
- The proportion of female graduates among CS master's degree recipients increased slightly, from 26.3 percent in 2021-22 to 26.8 percent in 2022-23. Among graduates whose residency and ethnicity is known, the proportion of CS master's degrees that went to Non-resident Aliens recovered 10 percentage points from last year's 15 percentage point drop, and is again at the 60 percent level.



CRA Update (continued)

• The record production of master's graduates is not expected to continue this year. The total number of new students in 2023-24 is much less than the number of graduates in 2022-23, while overall enrollment for 2022-23 reported by this year's master's programs is similar to that reported in 2021-22 by last year's master's programs (this year's reported enrollment is 0.6 percent less than last year's).

Bachelor's Programs

- Bachelor's degree production continued its post-COVID period rebound in 2022-23 with a second consecutive year of double-digit increase.
 Aggregated across all three areas, production was up by 17.6 percent. When considering only those departments that reported both years, the increase in total degree production across the CS, CE, and I areas was 15.5 percent among all departments.
- Gender diversity among bachelor's graduates was somewhat higher in 2022-23 than in 2021-22. Among graduates whose gender was reported, 23.3 percent were female in aggregate across all disciplines compared with 22.7 percent in 2021-22. The percentage of bachelor's graduates who are White decrease across CS, CE, and I.
- In aggregate across all three areas (CS, CE, and I), U.S. CS departments reported an increase in new majors per department of 3.4 percent. When only departments reporting both this year and last year are considered, the count of new majors increased by 7.3 percent across all departments, and 9.5 percent at U.S. CS departments. This is the third consecutive year of such increases.

Long-Time Taulbee Team's Swan Song

This year marks the final collaboration of the CRA Taulbee Survey's long-time partners **Betsy Bizot**, CRA Senior Research Associate, and **Stuart Zweben**, Professor Emeritus at The Ohio State University.

Bizot – who was honored with the **2021 Distinguished Alumni Award** from the Virginia Tech Department of Computer Science – is retiring from CRA after many years of service to CRA and the CRA Taulbee Survey.

About the Survey

Conducted each fall since 1974, the survey name honors Orrin E. Taulbee of the University of Pittsburgh, who conducted these surveys for the Computer Science Board until 1984, with retrospective annual data going back to 1970. In its current form, the survey documents trends in student enrollment, degree production, employment of graduates, and faculty salaries in academic units in the United States and Canada that grant PhDs in computer science (CS), computer engineering (CE), or information (I).

In 2020, the CRA Taulbee Survey was honored with the **Service to CRA Award** in recognition of 50 years of providing an invaluable resource to CRA as well as to the computing community.



Betsy Bizot



Stuart Zweben

The survey generally covers the preceding academic year, with the notably exception of faculty salary data, which are for the current year. CRA gathers survey data during the Fall. For this year, responses received by February 14, 2024 are included in the analysis. CRA surveyed a total of 314 PhD-granting departments and received responses from 176, for an overall response rate of 56 percent.

View the Report

To view previous years' reports, visit cra.org/resources/taulbee-survey/.

Congress Meets Robots: CRA Co-hosts Senate Robotics Showcase and Demo Day



By Matt Hazenbush, Director of Communications, and Brian Mosley, Associate Director of Government Affairs

The Computing Research Association (CRA), in collaboration with IEEE-USA and Carnegie Mellon University, was pleased to host Members of Congress, the media, and the public at the **Robotics Showcase and Demo Day** in the Hart Senate Office Building on April 30.

Honorarily co-hosted by the Senate Artificial Intelligence Caucus and supported by the Task Force on American Innovation, the interactive event showcased **35 exhibitors** – representing 17 states – from across industry, academia, and government. Among them were long-time **Computing Community Consortium** (CCC) contributors **Chad Jenkins** (Professor, Robotics, University of Michigan), **Melanie Moses** (Professor, University of New Mexico), and **Holly Yanoc** (Chair, Distinguished University Professor, NERVE Center Director, UMass Lowell).



National Science Foundation Director Sethuraman Panchanathan (left) speaks with Chad Jenkins (right), a roboticist and computer scientist at the University of Michigan.

Through interactive exhibits and informal discussions, attendees gained insight into the current state of US robotics innovation – particularly its integration with AI – as well as the transformative impact of these technologies on US competitiveness, regional economic growth, and workforce dynamics.

Speakers at the event included **Jeff Burnstein** (President, A3 - Association for Advancing Automation), **Dr. Sethuraman Panchanathan** (Director, US National Science Foundation), **Congressman Bill Foster** (11th District of Illinois), **Dr. Henrik Christensen** (Qualcomm Chancellor's Chair in Robot Systems, UC San Diego), **Stephen Ezell** (VP, Global Innovation, Information Technology and Innovation Foundation), and **Dr. Matthew Johnson-Roberson** (Director of the Robotics Institute and Professor, Carnegie Mellon University).

Join in on the discussion! Like, reshare, and comment on our LinkedIn, Facebook, and Instagram posts from the event.



Dr. Henrik Christensen, of the University of California, San Diego, speaks about the findings and recommendations of the 2024 edition of the US robotics research roadmap report. Dr. Christensen chaired the roadmap report committee.



Representative Bill Foster (D-IL) (left) speaks at the Senate Robotics Showcase & Demo Day, with National Science Foundation Director Sethuraman Panchanathan (right).

Our Favorite Pics From Grad Cohort for IDEALS and Grad Cohort for Women 2024



By Lauren Lashlee and Richard Elam, CRA-WP

Grad Cohort for IDEALS and Grad Cohort for Women were co-located for the first time this year and took place at the Hilton Minneapolis from April 11 - 13, 2024. In total, the CRA-Widening Participation committee welcomed more than 350 attendees, participants, and speakers to this year's combined event, making it one of our biggest and most successful gatherings ever.

Both programs emphasize the importance of community building, mentorship, and networking to support underrepresented groups in computing. The workshops included formal presentations, informal discussions, and social events, providing a supportive environment for participants to discuss professional development and personal experiences in the computing field.

With this first time co-location, the workshops shared two plenaries: the workshop keynote, by Dilma Da Silva, and Storytelling for Powerful Communication, by guest speaker Margie Zohn. Both sessions were well attended and received. The engagement was high and the energy in both sessions left attendees feeling motivated and ready to finish the semester strong.

Take a look at our favorite pictures from this year's **event**:





Grad Cohort (continued)

Grad Cohort for Women

Grad Cohort for Women began in 2004 and aims to build a nationwide community by connecting female graduate students in computing fields with senior women in academia and industry. The event focuses on mentoring and developing peer networks, covering survival skills for graduate school, career advice, and personal insights from experienced professionals. It's designed to increase the ranks of women in computing-related studies and research.

This year's agenda featured sessions applicable to early graduate students and later years graduate students. A highly attended early years session, "Summer Internships," featured speakers Cynthia Phillips from Sandia National Labs and Shruthi Kubatur from Apple. View the presentation slides here.

From our later years track, our most attended session was "PhD Career Paths and Job Search," which featured Jodi Tims from Northeastern University and Shruthi Kubatur from Apple (again!). Take a look at the presentation slides here.

There is a strong connection with growing job related skills so that these women are able to push open the door into these spaces that have been historically cracked open.

Grad Cohort for IDEALS

Grad Cohort for IDEALS launched as the Grad Cohort for URMD (Underrepresented Minorities and Persons with Disabilities) in 2018, this workshop addresses broader diversity issues by focusing on inclusion, diversity, equity, accessibility, and leadership skills. The event offers similar networking and mentoring opportunities and is tailored for students from underrepresented groups in computing, including racial and ethnic minorities, LGBTQAI+ individuals, persons with disabilities, and veterans. It aims to enhance participants' professional skills and prepare them for successful careers in computing research and academia.

This year's agenda featured sessions applicable to early graduate students and later years graduate students. A highly attended early years session, "Industry Vs. Academic Research Positions," featured speakers Shaun Kane from Google and Pamela Gibbs from AnitaB. Check out the presentation slides here.

From our later years track, our highest attended session was "Preparing your Thesis Proposal and Becoming a PhD Candidate," which featured Dorian Arnold from Emory University and Cheryl Seals from Auburn University. View the presentation slides here.

At Grad Cohort Workshop for IDEALS, participants embarked on an enriching journey, engaging with esteemed senior computing researchers and professionals. These mentors generously shared invaluable insights on navigating the challenges of graduate school and offered personal anecdotes, fostering a supportive environment ripe for growth. Through a dynamic blend of formal presentations, lively discussions, and vibrant social events, participants explored diverse pathways in academia and industry, igniting their passion for the field.

Attending the IDEALS Workshop wasn't just an event; it was a catalyst for profound connections and transformative experiences. Participants forged lasting mentoring relationships and cultivated robust peer networks, laying the groundwork for future endeavors. Empowered by newfound knowledge and inspired by the camaraderie of like-minded peers, they embarked on their graduate journeys with renewed vigor, ready to conquer challenges and seize opportunities, both in academia and beyond.

#CRAGradCohort Social Media Competition

This year, CRA-WP launched its first ever Grad Cohorts social media competition! We encouraged participants to share their experiences on Facebook, Linkedin, and Instagram using the hashtag "#CRAGradCohort". Participation in the competition exceeded our expectations and even though the winners were already announced, we still have attendees sharing about their wonderful experiences!



Grad Cohort (continued)

We had two winners this year for our social media competition, find out more about them below!



Ozioma Oguine, University of Notre Dame

Ozioma "Ozzie" Oguine is a 2nd year Ph.D. student in the Department of Computer Science and Engineering at the University of Notre Dame. He is a Graduate Justice Fellow, advised by Dr. Karla Badillo-Urquiola at the EPOCH Research Lab. His research cuts across the intersection of human-computer interaction, online safety & privacy, disability studies, and responsible computing. As an advocate for digital inclusivity, his research focuses on studying the unique online experiences of adolescents from underrepresented and minority backgrounds to develop tailored technology interventions and policies that empower teens to be agents of their online safety.

"At the IDEALS Workshop, I had the privilege of networking with and discussing with mentors and role models from diverse fields in computing within academia and industry organizations like NASA and Google. The workshop sessions offered me valuable insights on how to prepare for my dissertation proposal, balance graduate school & personal life and how to advocate for myself as a student with disability in graduate school. Engaging with fellow graduate students in my cohort from various colleges sparked fruitful conversations on ideas and experiences, significantly enriching the workshop value overall." – Ozzie Oguine



Promise Ekpo, Cornell University

Promise Ekpo Osaine is a Ph.D. student in the Computer Science Department at Cornell University, advised by Prof Angelique Taylor and Prof. Sanjiban Choudhury. Her Ph.D. research investigates techniques to enable safe cooperation and ensure alignment between humans and robots during their collaboration in team settings especially in safety-critical environments such as hospitals.

Her dedication to diversity, inclusion and academic excellence has been recently recognized through the Women in Technology Cadence Diversity in Tech Award, an honor that underscores her efforts to dismantle barriers and foster a diverse technology community. In Cornell, She has been recognized

with the Exemplary Leadership Award for Early Career Graduate Students, 2024.

She completed her Masters in Science of Engineering in the department of Computer Science at Princeton University in United states, 2023 supervised by Prof. Jaime Fernández Fisac. Before that, She received my B.Eng from University of Benin, Nigeria. Before joining Cornell in Summer 2023, She spent eleven weeks as an Al Safety and verification intern doing R&D work at Siemens Technology. Her hobbies are playing the piano and working out at the gym.

"The CRA-WP Ideals conference was a transformative experience, enriching my professional development and expanding my network significantly. I learnt a lot from the academic workshops which covered everything from preparing a PhD proposal to exploring what research careers in industry and academia look like. Also, I was able to create a WhatsApp group to stay connected with the 24 Nigerians I met during the event. This group was instrumental in organizing meetups after the event and fostering ongoing connections." – Promise Ekpo Osaine

For more detailed information and to be on the lookout for next year's Grad Cohorts, you can visit the CRA-WP pages for the Grad Cohort for Women and Grad Cohort for IDEALS

CRA-Industry Co-chair Vivek Sarkar Named Dean of Georgia Tech College of Computing



By Elora Daniels, Communications Associate

After a nationwide search for its next Dean, the Georgia Institute of Technology recently announced that Dr. Vivek Sarkar will be its next Dean of the College of Computing effective June 2024. A founding member and Cochair of the CRA-Industry (CRA-I) committee and former CRA Board of Directors member, Sarkar is a long-time contributor to CRA, and looks forward to deepening Georgia Tech's ties to CRA in his new role.

"My goal is for Georgia Tech to become the best possible partner for CRA!" said Sarkar. "CRA plays such an important role in the computing research community, and as the new Dean of the College of Computing I hope to strengthen our relationship and find new and exciting ways for our faculty and students to engage with all that CRA does and to help CRA in any way that we can."



Among his career accolades and contributions to computing, Sarkar has recently been serving as Chair of the School of Computer Science and held the Stephen Fleming Chair for Telecommunications at Georgia Tech. As an avid mentor of young researchers, Sarkar has shown his dedication to fostering diversity and inclusion within the computing research community, a core tenet CRA is very proud to support.

"It will be an honor and a privilege to serve as the next Dean of the College of Computing," said Sarkar in the Georgia Tech **press** announcement. "We have a great community of faculty, staff, students, and alumni, and I look forward to all of us pulling together with the rest of the campus and our external partners to further advance our mission of addressing critical challenges related to computing and its impact on society."

In a personal profile highlighting Sarkar's path to becoming dean, CRA's Board Chair, Nancy Amato expressed great joy for his appointment: "Georgia Tech has made a great choice in selecting Vivek Sarkar as the next dean of its College of Computing... Vivek is one of the leading researchers in software for high-performance computing, having made important contributions in programming models, compilers, and runtime systems for parallel systems. He has also provided outstanding service to the CRA, serving on the Board of Directors and as one of the founding chairs of its newest committee, CRA-Industry."

As co-chair of the CRA-I committee, Sarkar has supported multiple initiatives, including the **Best Practices on Using the Cloud for Computing Research** workshop and report, the 2020 **Industry/Academia Report**, and CRA's **Accessible Technology** workshop. Since the formation of CRA-I in 2020, Sarkar has been a driving force in CRA-I becoming a recognized and respected liaison between academia and industry.

"Vivek's unwavering dedication as one of the founding co-chairs of CRA-I illuminates his commitment to bridging academia and industry. Instrumental in the committee's growth, his visionary leadership has propelled CRA-I to its present state. I have no doubt that he will take on his new role as Dean at Georgia Tech with the same vigor and enthusiasm." said Helen Wright, Manager of CRA-I.

CRA is honored to partner with Vivek Sarkar to continue collaborating on shaping the future of computing. Congratulations, Dr. Sarkar!

Data Buddies Annual Report and 2023 Public Dataset Now Available!



By CERP Staff

CRA and CERP are happy to announce that the **2023 Data Buddies Annual Report** and Public Dataset have been published and are now available as an updated resource for the computing community!

To access the annual report, click on the following link. If you would like to receive one of the 2023 Data Buddies datasets, please complete our data request form (linked here). Once you submit the form, you will receive your requested dataset shortly after at your provided email address.

Finally, we are happy to announce that all of the Data Buddies Department Reports have also been released to our volunteers, so if you are a participating Data Buddy, you should have received an email from **cerp@cra.org**. Your Department Report is accessible through our reporting portal, which includes all of your available departmental reports from recent years.

If you are not currently a Data Buddy, consider helping the computing community by signing up to become one today! Joining is free and easy, and your department will receive a report every year you participate in the project. Check out a sample report here!

If you are interested, please click here to learn more about Data Buddies and click here to sign up to participate!

Extended Deadlines – Explore Undergraduate Research & Graduate Student Mentor Training Opportunities



By Julia Sepulveda, Program Associate, CRA-E

The **UR2PhD program**, an initiative that aims to substantially increase the quality and scale of undergraduate research opportunities through mentorship and training, is offering two summer courses: a research methods and a mentor training course.

The undergraduate research methods course aims to equip students with the fundamental skills they need to be successful researchers while they contribute to a computing-related project. Over the course of 5-weeks, students working in groups of 2-4 will learn how to conduct literature reviews. They will also practice data analysis and presentation skills. All assignments in the course will be done in the context of the research project that students are working on. The course ultimately culminates with students writing and presenting a research proposal.

The graduate student mentor training course prepares participants to provide effective research mentoring. Students will learn how to tailor projects and provide scaffolding that promotes project and professional development. Course eligibility is limited to mentors of undergraduate researchers, with priority given to mentors of students in the research methods course. This requirement enables students to apply their learnings in a practical setting.

During the fall of 2023, the UR2PhD program successfully engaged more than 150 students across the U.S. and Canada. Feedback from both graduate and undergraduate participants highlighted how the program encouraged active communication and collaboration. Several first time researchers also expressed that the program cultivated continued interest in computing research.



Extended Deadlines (continued)

We strongly encourage students with an interest in research, especially those who identify as underrepresented within computing, to participate in our programming. Applications for the summer undergraduate student research methods course are still being accepted, and will be considered through the start of each session. Session A is scheduled to begin on May 20, and session B is slated to start on June 17, 2024.

To learn more about the courses and the UR2PhD program, please visit www.cra.org/ur2phd

Apply to Lead Graduate School Application Workshops



By Julia Sepulveda, Program Associate, CRA-E

In order to help students bridge the gap between a first research experience and graduate study, the **UR2PhD program** will be launching Graduate School Application Workshops for Computing Programs in the fall. These workshops will aim to support students in their final year of study as they apply to computing programs.

The UR2PhD team is seeking to hire 2 designer-facilitators to lead the planning, designing, and implementation of these workshops. Designer-facilitators will leverage existing CSGrad4US Mentoring Program materials to craft relevant and practical workshops so that students will be able to prepare compelling applications.

If you have experience mentoring undergraduates through the PhD application process and are passionate about encouraging students to consider graduate study, please consider applying. The roles will remain open until filled.

Learn more about the program and the role by visiting our website: www.cra.org/ur2phd and toggling to the "Job Opportunities" tab.

UR2PhD Funding Opportunity for Organizations Broadening Participation in Computing



By Julia Sepulveda, Program Associate, CRA-E

The UR2PhD program aims to broaden participation in computing by increasing the quality and scale of undergraduate research experiences. At this time, our program activities are cultivating stronger mentoring relationships and inspiring confidence and collaboration through training.

In order to strengthen the computing pipeline, we are currently accepting proposals for projects that complement UR2PhD's goal of increasing the number of gender-marginalized individuals who earn a PhD in a computing field.

Interested applicants must submit their applications, including a proposal (up to five-pages), no later than **11:59 p.m. PT on Saturday, June 8, 2024**. Grant eligibility is limited to non-profit organizations working on initiatives that support gender-marginalized (e.g. women, transgender, non-binary) computing students within the higher education pipeline.

For additional information about grants, please visit www.cra.org/ur2phd. Questions can also be directed to ur2phd@cra.org.

Between Mind and Machine: NLP Discoveries



By Yasra Chandio (CRA-E Fellow, University of Massachusetts Amherst) and Alejandro Velasco Dimate (CRA-E Fellow, College of William & Mary)

This Q&A highlight features Anya Ji, a Finalist in the 2023 CRA Outstanding Undergraduate Researchers award program. Anya finished her undergraduate degree in Computer Science and Psychology and her M.Eng in Computer Science at Cornell University.

What brought you to computing research?

My initial interest in cognitive science was broad and exploratory, leading me on a quest to pinpoint areas within the field that truly captivated me. Thus, I started as a research assistant in two labs. At the Affect and Cognition Lab, working on a project examining time perception/orienting response, I learned how humans understand time. At the Attention, Memory, and Perception Lab, where I worked on event segmentation advised by Professor Khena Swallow, I learned how people segment continuous



Anya Ji, B.A. in Computer Science and Psychology, and M.Eng. in Computer Science Cornell

activities (such as watching a movie, attending a lecture, or observing a sports game) into discrete events (major plot points or topics of the lecture or winners of the game) for better comprehension and memory. While working on these projects, I found my passion in language and, later, natural language processing (NLP). A project analyzing free recall data from the event segmentation experiments inspired me to look for research opportunities in the intersection of NLP and psychology.

How did you connect with your undergraduate research advisor?

Fascinated by Professor Yoav Artzi's work in NLP with an emphasis on learning from dynamic interaction with humans, I reached out to him to express my interest in NLP and cognitive science. I asked about potential research opportunities in his lab. My



NLP Discoveries (continued)

interdisciplinary background aligned with one of his new research collaborations with Professor Robert Hawkins at the University of Wisconsin Madison, so I was onboarded to work on this research.

What challenges did you encounter when you first started your research?

There was a lot of ambiguity since it was a new project, and we were starting from scratch. To navigate this, I engaged deeply, posing numerous questions to clarify our objectives and direction. I also proposed ideas for the experiment design, both as a demonstration of my grasp of the subject and as a means to solicit feedback for refinement. Through this process, I learned two things: firstly, that research fundamentally diverges from the structured nature of course assignments, which typically feature clearly delineated questions; and secondly, to make use of the mentorship available, do not be afraid of asking "dumb" questions, and take the initiative to understand the project fully and actively contribute to it.

Can you tell us about your project?

The challenge of interpreting abstract visual stimuli, like tangrams — puzzles made of seven geometric pieces that form meaningful shapes — stems from their inherent ambiguity, posing difficulties for both humans and multi-modal models. These puzzles are often used in cognitive science research for their abstract nature, which can drive consensus or foster diverse interpretations. However, existing tangram datasets are small, limiting their utility in machine learning. A larger and more diverse dataset could significantly advance research in abstract visual reasoning across NLP and cognitive science, introducing fresh scientific inquiries. To address the scarcity of resources for studying abstract visual reasoning in both human and machine learning models, we developed an interactive crowdsourcing platform that amassed over 13,000 annotations and shape segmentations of 1,016 tangrams, creating the KiloGram dataset. Our metrics showed that pre-trained language models like CLIP and ViLT struggle with abstract tasks, but fine-tuning models improves their abstraction capabilities, highlighting a generalization gap. I presented this work at EMNLP 2022 and received the Best Long Paper Award.

What challenges did you encounter throughout the research process?

Faced with daunting tasks in research, such as initiating a crowdsourcing experiment, conducting complex data analysis, and fine-tuning novel models, I did not know where to start. I learned to break these tasks down into smaller, reachable goals and tackle them individually, acquiring many intermediate skills on the way. I learned that the research process could be messy, but the key to navigating it lies in meticulous planning, flexibility, and willingness to learn and adapt when initial strategies falter.

What were some of your favorite aspects of research?

Upon joining Prof. Artzi's lab, Alane Suhr and Noriyuki Kojima (Ph.D. students in the lab at the time)generously shared their knowledge in crowdsourcing and model training with me by discussing their projects, which offered both technical insights and inspiration. This experience catalyzed my learning journey, where a straightforward data collection task became a gateway to mastering a diverse set of skills.

How has participating in research shaped your professional path?

My research has fueled my curiosity by exploring the possibilities that emerge from applying insights from both human and machine reasoning to practical uses. In my career, I aim to engage in multimodal machine learning research and engineering to develop virtual and physical agents that will possess a deep understanding of human cognition and the ability to generalize using vision and language. My goal is to create solutions like software copilots or robotic companions that seamlessly integrate with human activities, enhancing our capabilities and collaboration in everyday scenarios.

Do you have any advice for other students looking to get into research?

Start early and try different things. Expect ambiguity, ask questions, and be prepared to learn a lot of things to solve a problem from scratch.

New BPCnet.org Resource on BPC Shared Measures



By Andres Purpuro, Program Assistant, CERP, and Toyamim Rahman, Program Associate, CERP

CRA is excited to announce the launch of the BPC Shared Measures Page on BPCnet. org. This collaborative effort, as part of the "BPC-DP: Developing Shared Measures Among the BPC Community" project, has been funded by the National Science Foundation (NSF award 2137842) as a BPC demonstration project.



Collaborating with the NSF BPC Alliances, CRA's Center for Evaluating the Research Pipeline (CERP) and SageFox Consulting Group led this initiative that builds upon prior

data collection efforts and was completed in four phases: framing, collaborative work, NSF BPC Alliance implementation efforts, and aggregating lessons learned, sharing findings, and defining a sustainability plan. The project team also worked with Dr. Monica McGill and Dr. Julie Smith, Institute for Advancing Computing Education (CSEdResearch.org), to create a technical report that documented the process of coming up with a shared measurement framework, and lessons learned throughout the process.

What to expect

Explore a framework for standardizing metrics and assessment tools designed to promote transparency, partnership, and continuous improvement across BPC efforts. The BPC Shared Measures project has resulted in two sets of measurement templates: participation data template and capacity building data template. Whether you're a faculty member, researcher, or administrator involved in BPC, this resource provides valuable insights for improving data collection and assessment.

How to access

Visit the BPC Shared Measures Page today at https://bpcnet.org/bpc-shared-measures/ to explore this resource. For any questions or feedback, please contact the BPCnet team at bpcinfo@cra.org.

CERP Infographic: What motivates students to participate in formal research experiences?



By Ama Nyame-Mensah, Senior Research Associate, CERP

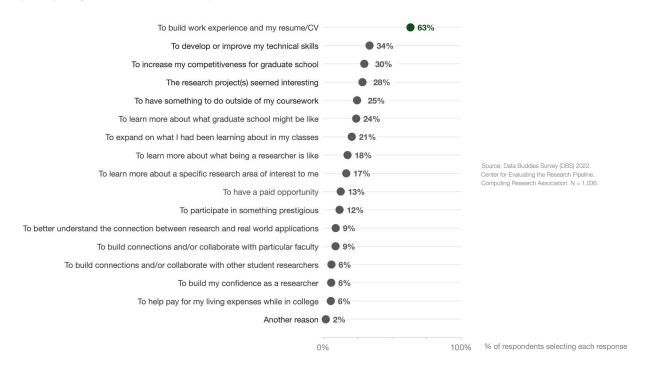
Undergraduate research experiences are a promising tool for recruiting and retaining students in computing disciplines. Some studies show that undergraduate research opportunities help students gain confidence in their ability to conduct research, acquire valuable knowledge, and explore professional and career options (Alvarado, Villazon, & Tamer, 2019; Nyame-Mensah, Tamer, & Stout, 2015). Although these experiential learning opportunities have many benefits, little is known about why students choose to take part in these experiences.

The Center for Evaluating the Research Pipeline (CERP) recently surveyed 1,036 undergraduate students majoring in a computing-related field who reported having participated in a formal research experience where they worked closely with a mentor or research advisor (i.e., a formal REU). CERP asked survey participants to select up to three reasons from a list of seventeen that best explained their motivations for participating in a formal REU.



CERP Infographic (continued)

Undergraduate students cite **building work experience** as a top reason for participating in a formal research experience.



Survey responses were summarized using frequency counts and percentages. The results showed that among those surveyed, more than half (63%) indicated that one motivation for participating in a formal REU was to build work experience and their resume or CV. A desire to develop or improve their technical skills (34%) or increase their competitiveness for graduate school (30%) were among the next two most selected reasons students were motivated to participate in a formal REU.

This analysis revealed the most frequently cited reason undergraduate students choose to participate in a formal research experience is to gain work experience and build their resumes. Future work should examine whether different groups of students report similar or dissimilar reasons for participating in formal REUs.

Notes:

The survey data analyzed for this infographic were collected by the Center for Evaluating the Research Pipeline via the Data Buddies Project. The sample includes 1,036 undergraduate students. All survey participants indicated they were declared computing majors and had participated in a formal research opportunity where they worked closely with a mentor or research advisor.

The Data Buddies Project is currently supported through National Science Foundation (NSF) awards CNS-1840724, CNS-2036717, DUE-1821136, sub-awards and contracts, and direct CRA contributions. Previous NSF awards that supported DBS include CNS-1246649 and DUE-1431112. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

This analysis is brought to you by the CRA's Center for Evaluating the Research Pipeline (CERP). CERP provides social science research and comparative evaluation for the computing community. Subscribe to the CERP newsletter. Subscribe to the CERP newsletter here. Check out CERP's activities and find out how to engage on CERP's website.

CCC Sponsored AI/OR III workshop: Engaging the Synergies of the AI and OR Communities



By Petruce Jean-Charles, Communications Associate, CCC

An interdisciplinary group of 50 researchers attended the third Artificial Intelligence/
Operations Research (AI/OR) workshop in late
March in Washington, DC. Presentations ranging
from the opioid epidemic to integrating OR and
Al through the optimization lens, discussing
challenges that require collaboration between the
two communities in Operations Research (OR) and
Artificial Intelligence (AI).

In 2021, the first AI/OR workshop was convened to establish the joint strategic vision. Researchers from the OR and AI communities presented on theories and applications and discussed ways to foster collaboration between the two

communities and make it more widely accepted and promoted.



"We needed to make sure that we get greater recognition for the researchers and practitioners in both OR and Al, and we felt it was important to bring the two communities together," said Dr. Radhika Kulkarni, an Advanced Analytics professional. "Because each community has a lot to offer that's valuable to the other. What can we do together that is even more than what each community can do on its own?"

Dr. Kulkarni added that the third workshop put out a broad call for **proposals** for some grand challenges, seeking specific problems where they can demonstrate the added value of Al and OR researchers working jointly.

Dr. Kulkarni further explained that, "In the current workshop, we are looking at consequential problems in society which require the collaboration of both communities to come at problems with a slightly different perspective. OR researchers are trained to look at a systemic way to address problems, from data, to modeling, to implementation and how to solve a business problem. Computer scientists start with data and research innovative algorithms to gain value from data. OR tends to use a model-driven type of philosophy and computer science has always adopted adata-driven model. More recently, an increasing number of OR researchers are also looking at data- and model-driven approaches. One of the goals for this workshop was to discuss how can we make sure that each community has a place in the other community for publishing and conferences because the greater we interact, the better we can collaborate," Dr. Kulkarni said.

Dr. Kulkarni is pleased with the amount of discussion during the event for collaboration among the communities. The presentations were met with questions and comments for researchers from across the US and other parts of the world, including Germany, Israel and Singapore, such as Pradeep Varakanthan, Professor of Computer Science at the School of Computing and Information Systems at Singapore Management University.

Varakantham found many of the problems interesting and they opened his mind to challenges he had never considered. "One of the fascinating things that people were talking about were these challenge problems which I hadn't known; some of the domains I knew but the way the problem was presented was quite interesting. I think that is something that I will take away from this event. Purely based on what the workshop is about, I think I definitely learned a lot of interesting challenge problems that I will think about because some of them are relevant to what I am trying to accomplish."



CCC Sponsored AI/OR III workshop (continued)

The discussions were an impactful part for Varakantham in this workshop. "There's lots of really cool ideas floating around. There were lots of discussions which I miss these days in computer science conferences. They've grown so huge that people barely talk about concrete research directions and concrete research problems. Here there are lots of discussions, lots of good questions coming through, and lots of big challenge problems that have been presented."

The workshop organizers, along with some of the attendees, have begun drafting a report which will encapsulate not only the discussions held at the third workshop, but also the findings and recommendations which have come out of all three workshops. Keep an eye out for this workshop series report in the coming months.

Visioning Workshop Report Released: The Future of Research on Social Technologies



By Haley Griffin, Program Associate, CCC

In November 2023, CCC hosted a workshop on "The Future of Research on Social Technologies" in Washington, DC. The event, also supported by the John S. and James L. Knight Foundation, addressed the past, present and future of social technologies research. The workshop brought together over 50 information and computer scientists, social scientists, communication and journalism scholars, and policy experts.

The workshop was organized by Motahhare Eslami (Carnegie Mellon University). Eric Gilbert (University of Michigan), and Sarita Schoenebeck (University of Michigan). The workshop organizers, along with nine workshop participants, wrote a fascinating workshop report based on workshop discussions that has been released today. The report explores



what we do not know enough about in regards to social technologies, and what we should spend resources on in the coming years.

Below is a summary of the high-level opportunities (organized by theme) presented in the workshop report:

Rethinking Social Platforms

- · Researchers can help inform the governance of social platforms in ways that are social, technical, and legal.
- Researchers can significantly inform the trajectory of emerging decentralized social platforms, over the near- and long-term.
- Researchers can build methods—both quantitative and qualitative—to measure and assess the "health" of social platforms and online communities.

Social Technologies and Democracy

- Researchers can significantly shape the design and study of social technologies to encourage democratic principles and protect against threats.
- The research community should invest in mutual support and stand up for threatened researchers, and advocate for strong protection for societally important, yet threatened, research at their home institutions.



Visioning Workshop (continued)

Social Technologies and Al

- · Researchers should investigate and design mechanisms to use AI for prosocial ends in online communities.
- Researchers have an opportunity to build and test new designs for social platforms that recognize the presence of Al-generated content.
- Researchers can help safeguard certain social data from appropriation by AI systems, and AI systems from certain social data.

Research Access and Practice

- Researchers should study both big platforms and small, niche communities with respect to data access opportunities.
- Researchers should explore opportunities to develop shared infrastructure and practices for data collection and sharing, and experimental work.

Impact Beyond Academia

- The research community can increase the potential for impact by shifting incentive structures to recognize diverse kinds of work and contributions, particularly high-impact, large-scale, and/or community-centered work.
- Researchers can explore new models of research that move beyond individual researchers towards collective efforts.
- · Researchers have an opportunity to impact policy related to social technologies.

The workshop report authors provide many concrete opportunities in each of these areas, and elaborates on the potential researchers have to make the social technologies ecosystem more useful, secure, and equitable.

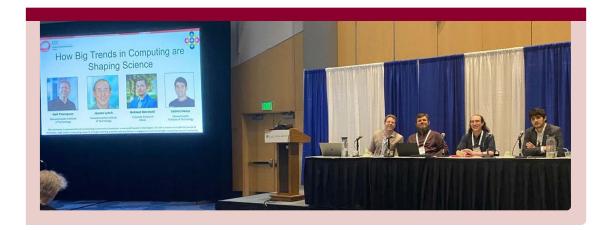
Read the full Future of Research on Social Technologies CCC Workshop report here.

CCC @ AAAS: How Big Trends in Computing are Shaping Science - Part One



By Catherine Gill, Program Associate, CCC

CCC supported three scientific sessions at this year's AAAS Annual Conference, and in case you weren't able to attend in person, we are recapping each session. This week, we will summarize the highlights of the session, "How Big Trends in Computing are Shaping Science." In Part 1, we will hear from Dr. Neil Thompson, from the Massachusetts Institute of Technology, who will explain the computing trends shaping the future of science, and why they will impact nearly all areas of scientific discovery.



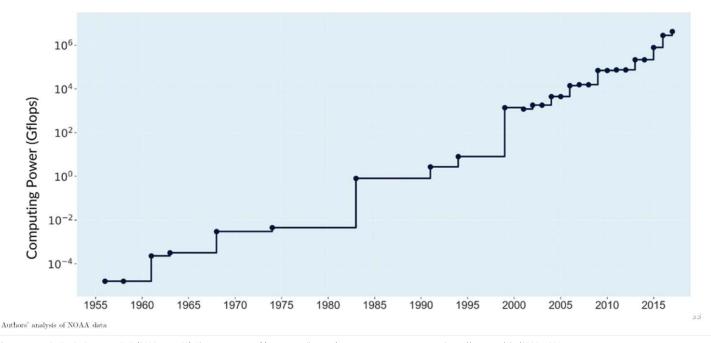


CCC @ AAAS (continued)

CCC's third AAAS panel of the 2024 annual meeting took place on Saturday, February 17th, on the last day of the conference. The panel, comprised Jayson Lynch (Massachusetts Institute of Technology), Gabriel Manso (Massachusetts Institute of Technology), and Mehmet Belviranli (Colorado School of Mines), and was moderated by Neil Thompson (Massachusetts Institute of Technology).

Neil Thompson, director of the FutureTech project at MIT, kicked off the panel by giving background on the specific trends in computing that the panel intended to focus on, those being the end of Moore's Law and the rise of Artificial Intelligence. "Throughout this panel", said Dr. Thompson, "we will discuss how these trends are shaping not only computing but much of scientific discovery." Weather prediction, for example, is something computers have been used on for a very long time. Back in the 1950s, researchers began to use computers for weather prediction, and the graph below displays the power of the systems NOAA used to make these predictions over time. The Y axis shows the computing power, and each jump on the graph is a factor of 100. "Over this period from 1955 to 2019", said Dr. Thompson, "we have had about one trillion-fold increase in the amount of computing being used for these systems. Over this period, we have noticed not only an incredible growth in the power of these systems but also an enormous increase in the accuracy of these predictions."

Weather Prediction 1 trillion-fold increase in computing power!



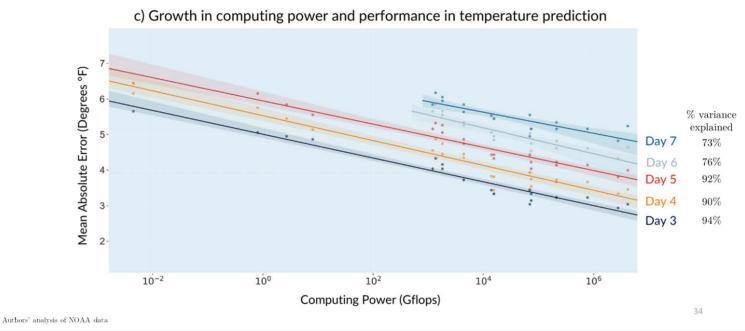
Thompson, N. C., Ge, S., & Manso, G. F. (2022, June 28). The importance of (exponentially more) computing power. arXiv.org. https://arxiv.org/abs/2206.14007



CCC @ AAAS (continued)

The graph below displays the error rate of these predictions in degrees Fahrenheit over an increase in computing power over the same time scale (1955 – 2019). "We see an incredibly strong correlation between the amount of computing power and how accurate the prediction is", explained Dr. Thompson. "For example, for predictions three days out, 94% of the variance in prediction quality is explained by the increases in computing power."

Weather Prediction Computing power has produced big gains

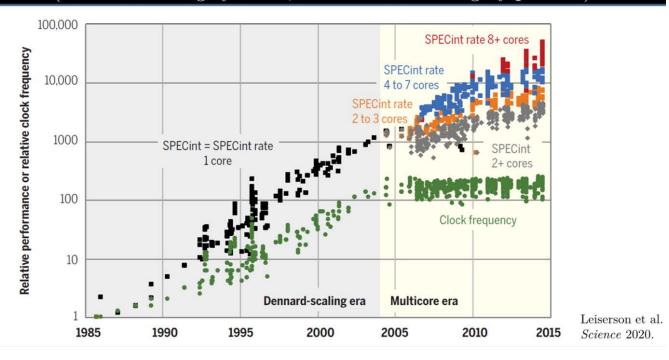


Thompson, N. C., Ge, S., & Manso, G. F. (2022, June 28). The importance of (exponentially more) computing power, arXiv.org, https://arxiv.org/abs/2206.14007

Researchers are not just using more computing power; the availability of increased computing power allows scientists to develop better algorithms that, consequently, can harness this power more efficiently and get more out of these powerful models. For the past 40 to 50 years, we have been able to rely on more computing power because Moore's Law had not yet reached its limits, and computing power has continued to grow on a regular basis without significant increases in cost. However, with Moore's Law coming to an end, scientists could no longer rely on regular increases in computing power with low associated costs as they did before. The graph below shows this trend slowing. The Y axis on the graph shows the relative performance compared to a system in 1985, and each dot represents a single computing system. The green dots show how fast these computers run in terms of the clock frequency. "We saw exponential improvements for decades until it plateaued in 2005 at the end of Dennard scaling when chips could no longer run faster. Scientists began to use other methods to increase performance, such as using multi-core processors", said Dr. Thompson. The black dots show this shift, during which time researchers continued to see exponential improvements. Serialized computing, as shown in the gray line, is unable to take advantage of parallel computing, and we can see that progress slowed way down after 2005. "With increased parallelism, we hope to continue leveraging the growing computing power that we are used to, a trend that also accounts for the increasing production of more specialized chips", explained Dr. Thompson.

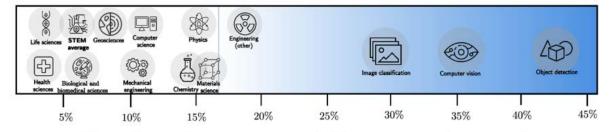


Computing Performance (SPECint = largely serial, SPECint rate = highly parallel)



Dr. Thompson then turned the audience's attention to deep learning. "When it comes to costs, what is going on in deep learning looks very different from other kinds of science. The figure below displays the share of research costs for different research projects that are spent on capital, such as the hardware and equipment necessary to conduct these kinds of research. In most areas of research, the amount of money allocated towards capital is constrained to 20% or less. However, the research being done in artificial intelligence usually requires about a third of the budget to be spent on capital."

Doing science with deep learning is different



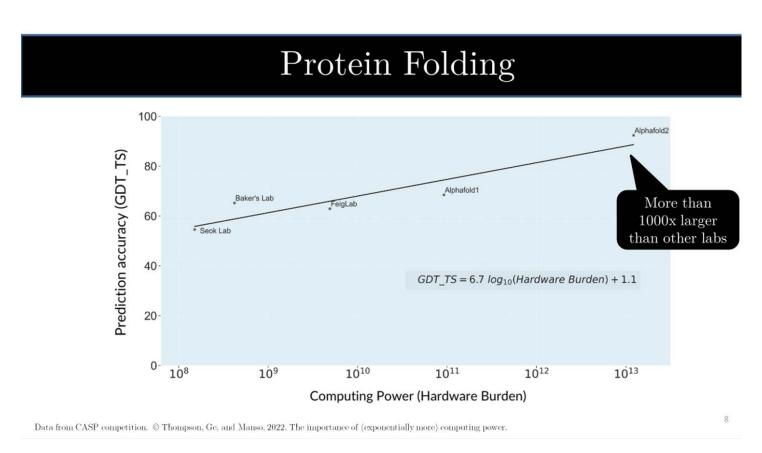
Share of research costs spent on capital (computers, equipment, etc.)

Besiroglu, Emery-Xu, and Thompson (2023)



CCC @ AAAS (continued)

Given that AI research is very expensive and capital-intensive, we can see very different performances in different tasks. Predicting protein folding, for example, has seen incredible progress since we began using AI to predict these patterns. The graph below displays different research groups who are studying protein folding using AI. "Alphafold I and 2, developed by DeepMind, have achieved remarkable success and are positioned prominently on this continuum. Their significantly higher accuracy rates are largely attributed to their use of systems that harness computing power on a scale much larger than those employed by the groups to the left. This indicates that access to substantial computing resources will play a crucial role in advancing scientific progress."



Check out the CCC Blog for a summary of Gabriel Manso's presentation on The Computational Limits of Deep Learning.

Expanding the Pipeline: Will ChatGPT Expand Diversity in Computing? We don't think so. Reasons for Concern and Paths Forward



By Lamia Youseff, Ph.D. with the help of Claude 3 Sonnet

Since the launch of ChatGPT, there has been immense public interest in how AI may disrupt industries, replace some human workers and even create new jobs. Like any transformative technology, the recent rise of large language models (LLMs) and generative AI has sparked both hope and fear about the future. A key question is whether these AI advances will improve diversity and inclusion for underrepresented groups and persons with disabilities in the computing field.

While some are optimistic that AI could help level the playing field, several concerning factors suggest recent AI developments may widen participation gaps for women, minorities, and individuals with disabilities in computing unless proactive steps are taken.

Systemic Bias Baked Into the Data

A major issue is that large language models like ChatGPT inherit societal biases from the data they are trained on. In a recent article titled, "Gender Bias in Automated Decision Making Systems (ADS)," [https://www.acm.org/binaries/content/assets/public-policy/aigenderbiaspaper.pdf] the authors argue that "machine-learned ADS systems may discriminate against certain groups or individuals by reflecting or reinforcing human or society structural bias, or by even introducing new bias." This report discusses the potential biases in artificial intelligence (AI) systems regarding gender, exploring how biases in training data and algorithm design can lead to unfair outcomes. It examines various case studies and presents recommendations for mitigating gender bias in AI, including improving data collection, increasing diversity in AI development teams, and implementing fairness metrics during model development.

Widening Confidence Gaps

Another risk is that widespread capabilities like ChatGPT could worsen confidence gaps holding back women and minorities in computing fields. Numerous studies have shown that women and underrepresented minority students tend to underrate their own abilities compared to men from majority groups of the same skill level. The sudden emergence of highly capable AI assistants could exacerbate these effects if students would further doubt their skills relative to AI.

Additionally, LLMs systems like ChatGPT can give the user superficial high-level coverage of any topic through few prompts. Coupling this with the original recognized confidence gap in women and minority groups along with the "imposter syndrome" commonly found within these communities will create a vicious circle where women and minorities feel less qualified and will create a bigger confidence gap within the computing field.

Disproportionate Job Displacement

There are also concerns that, as Al automates certain computing tasks, associated job displacement may disproportionately impact women and minorities first due to existing inequalities in hiring, retention, and career progressions. Vulnerable groups often have less secure footing, making them more exposed to workforce shifts.

Paths Forward

To realize Al's potential for expanding diversity rather than hindering it, concerted efforts from industry, educators, and policymakers are needed through a series of activities. Some of these activities are specific to Al and others are a continuation of the current activities which have been underway for increasing participation of women and underrepresented groups in computing. Specific efforts include:



Expanding the Pipeline (continued)

1. Debiasing training data and models

New technical approaches to detect, measure, and mitigate systemic biases in Al training data and models will be vital. Increased transparency around datasets and model guardrails are also key, whether they are for closed-source models such as GPT4 and ChatGPT or open-sourced models such as Ilama-3.

2. Developing inclusive AI governance and Guardrails

Multi-stakeholder efforts to establish guidelines and governance around inclusive and ethical AI development, deployment, and impact monitoring will be crucial.

Some examples of other activities to promote women and underrepresented groups in computing in general, which are even more critical in the AI era include:

3. Promoting STEM participation and mentorship

Organizations like Women in Machine Learning (WiML, http://wimlds.org/) and Al4ALL(https://ai-4-all.org/), which provide support, mentorship, and education programs for groups underrepresented in Al, should be expanded.

4. Building confidence and skills

Proactive steps such as workshops on public speaking, interviewing, and other confidence-building activities for women and minority students will help counter Al-driven doubts. Efforts, such as CRA-W workshops (e.g., https://cra.org/cra-wp/grad-cohort-for-women/, https://cra.org/cra-wp/grad-cohort-ideals/, https://cra.org/cra-wp/mentoring-workshop/) have been instrumental for increasing diversity in computing, closing the pipeline leak in senior roles and reducing the impact of the revolving door for senior women in leadership. It is recommended that mentors and department heads encourage and sponsor participation in such workshops.

5. Tracking representation metrics

Consistent data collection and public reporting on the participation of women, minorities, and disabled individuals at all levels of Al education and careers is imperative to gauge progress.

6. Elevating role models and personal stories

Highlighting diverse role models and sharing personal stories of overcoming challenges can motivate and inspire people to persist in Al and computing paths despite obstacles.

Rather than leaving diversity in computing to chance, deliberate actions for inclusive AI development today can shape a more equitable future. Rapidly evolving AI capabilities present underrepresented groups both risks and opportunities - seizing the latter will require sustained commitment and vigilance.

About the Author:

Dr. Lamia Youseff is a tech executive and AI/ML expert with over two decades of experience in academia (MIT, Stanford, UCSB) and industry (Google, Microsoft, Facebook, Apple). A founding engineer of Google Cloud, she has led multi-billion dollar AI/cloud businesses. Holder of several patents and author of 20+ papers, she advises startups in generative AI. Currently, she is Chief Executive at JazzComputing.com, a visiting researcher at Stanford, and an MIT research affiliate. Youseff teaches business management, AI strategy, and leadership at Stanford GSB, where she earned her Master's in Management. She also holds a Ph.D. and M.Sc. in Computer Science.

Get To Know NSF CSGrad4US: Highlighting Current Fellows



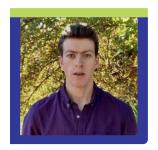
By Elora Daniels, Communications Associate

Applications for the NSF CSGrad4US fellowship program are due May 31! In anticipation of the upcoming deadline, the Computing Research Association (CRA) is wrapping up our highlight series of some of the current Fellows participating in the program.

The NSF CSGrad4US Fellowship is open to anyone who has been out of school since January 2024. To help answer questions from the community and provide general insights into the program, the CSGrad4US team hosted an **informational webinar** to answer questions for those interested in applying this year.

Learn more and apply for the CSGrad4US Fellowship by May 31, 2024: https://cra.org/csgrad4us/

CSGrad4US fellows come from all walks of life. Get to know a few more of their incredible stories:



Evan Frenklak, University of Texas at Austin

Electrical and Computer Engineering — Computational/Medical Imaging

Evan is a first year PhD student and CSGrad4US fellow at UT Austin, working with Professor Jon Tamir in the Computational Sensing and Imaging Lab. Previously Evan worked in industry on radar R+D, including field projects with NASA to develop low-cost geophysical imaging platforms. His research interests include optimization models and signal reconstruction for accelerated MRI. A current project examines the impact of sampling patterns used in public MRI datasets on downstream analysis and algorithm training. Evan hopes to bridge ideas from applied math, computer science, and engineering to improve

clinical outcomes and make medical imaging more accessible.



Kate Glazko, University of Washington

Computer Science - HCI/Accessibility

Kate is a first-year PhD student at UW advised by Dr. Jennifer Mankoff. Kate's current research centers around the opportunities that generative Al could present for making areas such as design and fabrication more accessible. She is likewise interested in solutions to the ableist and inaccessible outputs that GAI models can sometimes produce. Kate's research interests also include more approachable, engaging ways of communicating information such as health feedback. Kate additionally

collaborates with Dr. Elizabeth Murnane (Dartmouth) Dr. James Landay (Stanford), Dr. Paula Moya (Stanford) on the WholsZuki and Perfecto projects which study novel methods of encouraging exercise in at-risk individuals. Previously, Kate did her MS and BS in CS at the University of Southern California where she worked on projects relating to human-robot interaction and neurodiverse learners. She additionally spent 6+ years in the software industry working in a range of roles including engineering and product management.



Seungwook Han, MIT

EECS — Generative Modeling, Foundation Models, LLM Alignment

Seungwook is currently a PhD Student at MIT CSAIL advised by Prof. Pulkit Agrawal. He received his undergraduate degree from Columbia. Previously, he has worked on improving the training efficiency of generative models. More recently, he has been building foundation models for decision making and investigating how to align language models more efficiently for the personalization of LLMs.



NSF CSGrad4US (continued)



Sarah Mundy, Columbia University

Computer Science – Malware in Quantum Computing

Sarah Mundy is a first-year PhD student advised by Professor Salvatore Stolfo. Her research interests are in cybersecurity applied to quantum computing, specifically looking at potential malware attack vectors. Previously, Sarah has worked with NASA's Office of the Chief Human Capital Officer in the workforce planning group, the Pentagon's Office of the Undersecretary of Defense Research & Engineering under the Principal Director of Al, on DARPA's Media Forensic program, and with various military and intelligence

research groups focused in the AI and ML spaces. She graduated from the University of Nevada, Reno with her BS in electrical engineering in 2013. She has received the Echostar Spot Award for outstanding performance on a satellite networking project, NAVAIR's Flight Test Excellence Award for her work planning Tomahawk missile software test flights, the UNR Outstanding Student Service Awards for both the College of Engineering and the Department of Electrical Engineering, 1st and 2nd place in the IEEE Region 6 paper and design competition, respectively, and is a Tau Beta Pi engineering honors society lifetime member. Her hobbies include running, lifting, hiking, reading science fiction and non-fiction, and taking care of her orchids and potted fruit tree.



Jeff Pflueger, Northeastern University

Computer Science - Robotics and Al

Jeff Pflueger is a 1st year PhD student in the Khoury College of Computer Sciences at Northeastern University working on robotics. He is advised by Michael Everett. His research interests are in verifiable machine learning, planning and decision making, and cognitive robotics. Jeff earned a BS in Engineering from Olin College of Engineering in 2018. Before starting his PhD, he worked as a software engineer in the autonomous vehicles and consumer robotics industries. While working, he primarily focused on robotics

systems, error-reporting and logging, and motion planning. In his spare time, he likes to bake, cook, and tackle all kinds of puzzles.



Jamie Rosas-Smith, Johns Hopkins University

Computer Science – NLP and Speech Processing

Jamie Rosas-Smith is a first-year PhD student in the Center for Language and Speech Processing (CLSP) at Johns Hopkins University, where he is advised by Prof. Anjalie Field. His research interests are primarily focused on natural language and speech processing for social applications. Prior to joining CLSP, Jamie completed his bachelor's degree in computer science at Wellesley College, conducted research in the areas of prosody, acoustics, and algorithms for detecting speech irregularities at MIT's Research Laboratory of Electronics, and

worked at Chase as a software engineer. He is a proud recipient of both the CSGrad4US Fellowship and the Percy Pierre Doctoral Fellowship.



Arghamitra Talukder, Columbia University

Computer Science — Computational Biology

I am currently enrolled in the Computer Science PhD program at Columbia University, specializing in the field of single-cell cancer genomics. My primary area of concentration centers on the development of probabilistic computational techniques, utilizing machine learning, to investigate and analyze various biological phenomena such as diseases and biomolecular interactions. My academic journey has been quite diverse, encompassing backgrounds in Electrical Engineering, Computer Science, and Biochemistry. I also spent two years working in

the semiconductor industry. In my leisure time, I enjoy watching films and engaging in the pursuit of learning new languages.

Learn more about the current CSGrad4US fellows and apply by May 31 at https://cra.org/csgrad4us

Theo Drane (Intel) Joins CRA-Industry Council



By Helen V. Wright, Manager, CRA-I

CRA-Industry (CRA-I) is delighted to announce that Theo Drane (Intel) has joined the CRA-I Council. He joins a **growing list of Council members**, led by CRA-I Council Chair Divesh Srivastava (AT&T), that will continue to work closely with the CRA-I **Steering Committee** to identify future committee directions, connect with the community, and achieve the goals of CRA-I.

"Theo is a passionate advocate for joint academic/industrial PhDs, and we look forward to Theo helping CRA-I build strong bridges between computing research in industry and academia," said Srivastava.

Dr. Theo Drane is a Principal Engineer at Intel Corporation where he founded and runs the Numerical Hardware and System Level Design Group within Intel Graphics. He worked for the Datapath consultancy, Arithmatica, after completing a Mathematics degree from the University of Cambridge. Moving to Imagination Technologies, he founded their Datapath team while studying for a PhD at Imperial College London's Electrical and Electronic Engineering Department. After a stint within Cadence Design System's Logic Synthesis division, Genus, he joined Intel's 3D Compute and Graphics division. His Intel team is an applied



research group acting as an internal consultancy working within the division and Intel at large. The group focuses on all aspects of architecting, implementing, optimizing and formally verifying math intensive hardware and system level design in general. The group offers and promotes 'Acadustrial' PhDs – simultaneous full time industrial employment and PhD enrollment; driving knowledge creation and transfer. Dr. Drane has served as Program co-Chair for IEEE International Symposium on Computer Arithmetic.

Please help the industry research community by continuing to nominate outstanding colleagues for the CRA-I Council. **Read more here** and send nominations to **industryinfo@cra.org**.

Welcome, Theo!



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Jacob Wolkenhauer, Senior Manager of Contracts and Grant Administration

Heather Wright, Associate Director of Data and Evaluation

Helen Wright, Manager, CRA-Industry

Evelyn Yarzebinski, Manager, CERP

Column Editors

Expanding the Pipeline

Soha Hassoun, Tufts University

Patty Lopez, New Mexico State University



Carleton College

Visiting Assistant Professor

The Department of Computer Science of Carleton College invites applications for a Visiting Assistant Professor position for 2024-2025. This position involves teaching up to four courses spread over two or three 10-week terms, including a mix of introductory and advanced courses, to be selected based on the successful applicant's interests and specialization. We are also open to part-time or part-year appointments.

Candidates with any specialty within computer science are encouraged to apply. A masters in computer science or a closely related field is required; a Ph.D. or substantial completion of work towards a Ph.D. is preferred.

View Job Posting

College of William & Mary

Visiting Assistant Teaching Professor of Computer Science

The Department of Computer Science at William & Mary, a public university of the Commonwealth of Virginia, invites applications for a non-tenure-track Visiting Assistant Teaching Professor position that will begin August 10, 2024. This appointment is for 1 year.

The department is open to applications from candidates with expertise in any area of computer science. The successful applicant will be expected to be an effective teacher and will have a 3-3



The Human Language Technology Center of Excellence at Johns Hopkins University was founded in 2007 to create next-generation algorithms for speech and language processing. We identify and create innovative technologies that have significant impact on challenging real-world problems. Our research addresses key challenges in extracting information from massive sources of text and speech.

Human Language Technology Center of Excellence

The HLTCOE is hiring excellent speech, NLP, deep learning, and Computer Vision researchers to join our team. We have immediate openings for non-tenure track Research Scientists at all levels of experience, as well as for post-doctoral fellows.

Please view current opportunities at https://hltcoe.jhu.edu/opportunities/.

We welcome all inquiries: hltcoe-hirina@ihu.edu.

teaching load to include courses at the introductory level or above in computer science. The teaching responsibilities provide flexibility for the successful candidate to teach courses aligned with their area of expertise.

Located in the center of historic Williamsburg and known as a public Ivy, William & Mary is consistently ranked in the elite group for best undergraduate teaching by U.S. News and World Report and is committed to a multi-year effort to strengthen and expand its computer science program. More information about the department can be found at https://www.cs.wm.edu.

Iowa State University

Postdoc Positions in Advanced Wireless, Open RAN, and Rural Broadband

The Center for Wireless, Communities and Innovation (https://wici.iastate.edu/) at Iowa State University has postdoc positions for research, development, innovation, and entrepreneurship in advanced wireless (e.g., URLLC in 5G-and-beyond systems), Open RAN, rural broadband, and applications. The positions

offer opportunities of contributing to exciting projects such as the \$16M ARA PAWR project (https://arawireless.org), \$20M ICICLE AI Institute project (https://icicle.ai), \$42M O-RAN project ACCORD (https://tinyurl.com/accordwireless), OPERA open-source ecosystem project (https://wici.iastate.edu/opera), and other projects of the WiCl Center (https://wici.iastate.edu/projects). For details, please check out https://wici.iastate.edu/career.

Oakland University

Special Instructor of Computer Science and Engineering at Oakland University

Position Title:

Special Instructor of Computer Science and Engineering at Oakland University

Job Description:

The Department of Computer Science and Engineering at Oakland University (OU) invites applications for two special instructor positions to begin on August 15, 2024. In addition to teaching, these positions also require engagement in outreach programs and institutional and public service.



Applicants must have a completed PhD in Computer/Information Sciences, or related fields by the beginning date of employment. Candidates must have excellent communication skills, strong ability to teach in general Computer/ Information Sciences discipline, specialties in Al, cybersecurity, data science are highly regarded, willingness to learn new teaching techniques and technologies are highly valuable. Prior teaching experience in a comparable college environment is preferred. Candidates should have an appreciation of and commitment to the value of diversity and working with a diverse faculty and student body.

Minimum Qualifications:

Applicants must have a completed PhD in Computer Science, Information Technology or closely related fields by the beginning date of employment.

School/College/Dept Summary:

The Department of Computer Science and Engineering offers BS degrees in Computer Science, Information Technology, Cybersecurity and Artificial Intelligence; MS degrees in Computer Science, Cybersecurity, Software Engineering and Information Technology and Artificial Intelligence; Ph.D. degrees in Computer Science and Informatics.

OU Standard:

The University is located on 1,443 acres of scenic land in the cities of Rochester Hills and Auburn Hills in Oakland County, Michigan. The University offers 142 bachelor's degree programs and 138 graduate degree and certificate programs.

Academics include programs in the College of Arts and Sciences, School of Business Administration, School of Education and Human Services, School of Engineering and Computer Science, School of Health Sciences, School of Medicine and School of Nursing. As an anchor institution in southeastern Michigan that is dedicated to building ongoing, collaborative relationships, Oakland University embraces community and civic engagement to enhance the lives of its students and positively impact the broader community. Learn more about Oakland University's Mission & Vision and Strategic Plan.

Special Instructions:

Review of applications will begin on April 1, 2024 and continue until the position is filled. Applicants should submit a Cover Letter, CV, Teaching Statement, Diversity Statement, transcripts (unofficial) and contact information for three references.

Link:

https://jobs.oakland.edu/postings/30426

EEO:

Oakland University is an Affirmative Action/ Equal Opportunity Employer and encourages applications from women and minorities.

Old Dominion University

Multiple Non-Tenure Track positions in Cybersecurity

The School of Cybersecurity at Old Dominion University invites applications for three Lecturer positions to begin in Fall 2024.

The School of Cybersecurity was established in 2020 and houses one of the largest cybersecurity programs in the nation. The school has been designated by NSA and DHS as a National Center of Academic Excellence in Cyber Operations and a National Center of Academic Excellence in Cyber Defense and has been rapidly growing with a total of about 1450 students. ODU is Virginia's forward-focused public doctoral research university, with a top R1 research ranking, rigorous academics, an energetic residential community, and initiatives that contribute \$2.6 billion annually to Virginia's economy.

For more information and to apply, visit https://jobs.odu.edu/postings/19814.

Old Dominion University is an equal opportunity, affirmative action institution. Women, veterans, and individuals with disabilities, and other individuals from minoritized communities are encouraged to apply.

Oregon Health and Science University

Professor of Biomedical Data Science

The Center for Biomedical Data Science (CBDS) at the Knight Cancer Institute (KCI) at Oregon Health and Science University (OHSU) is searching for multiple tenured or tenure-track faculty positions at all ranks (Assistant Professor, Associate Professor, and/or Professor) in the area of Biomedical Data Science. Faculty will be members of CBDS with primary tenure home in the Division of Oncological



Sciences (DOS) at KCI. A secondary appointment in a different unit at OHSU is possible depending on the candidate's discipline and research focus.

The newly founded CBDS, as a nexus for research in data science at OHSU. is dedicated to advancing precision health in general, and precision early cancer detection and therapies in particular, by analyzing large, complex, multimodal multi-scale data through the development and implementation of novel computational analytical tools and methods. The data science goals include identifying biomarkers associated with response and resistance to therapy; modeling etiologic causes of cancer; modeling the development and progression of cancer; organizing and processing large data resources to create harmonized datasets; and mining datasets for novel subtypes of diseases. The field analyzes all kinds of cancer data, including omics, anatomical imaging to molecular imaging to nanoscale imaging, cellular and pathway interactions, electronic medical records, and published literature. A key area of focus is integrating datasets, such as combining public and private datasets or merging data across modalities, and doing novel analyses on integrated datasets.

To serve these goals, CBDS seeks interdisciplinary scholars whose work spans diverse areas, including but not limited to: machine learning, computer vision, natural language processing, Al-enabled health, computational biology, systems biology, bioinformatics,

biostatistics, dynamic modeling, responsible and interpretable Al, multiscale multi-modal data integration, and data analytics and visualization.

Rice University

Executive Director for Research Initiatives

The Ken Kennedy Institute at Rice University (https://kenkennedy.rice.edu/) was established in 1986 and is dedicated to advancing research in Al, Data, and Computing. The Institute seeks an Executive Director for Research Initiatives. In collaboration with the Faculty Director and its Advisory Board, the Executive Director will develop plans to achieve the Institute's mission and strategic priorities and will be responsible for implementing these plans. The emphasis is on fundraising and community-building internally and externally. The ideal candidate will have a Ph.D. in a related field and prior work in Data Science and Al.

Further information and application instructions are available at https://bit.ly/4a3gizw.

University of Alabama at Birmingham

Non-tenure-track Assistant Professor in Teaching

The Department of Computer Science at the University of Alabama at Birmingham (UAB) is seeking candidates for a non-tenure-track assistant professor in teaching position, starting Fall 2024.

Candidates with teaching expertise in all core computer science topics are sought, with preference given to Programming, Algorithms and Data Structures, Computer Architecture, Data Science/Machine Learning, Networking, Systems Programming, Operating Systems, Webbased Application Development and Software Engineering. For additional information about the Department, please visit: https://www.uab.edu/cas/computerscience/. UAB is a Carnegie RI research university, Alabama's single largest employer, and an engine of revitalization for Birmingham – Alabama's largest city.

For the complete job announcement and application procedures, see https://uab.peopleadmin.com/postings/19742. For more information, please contact the search committee chair Dr. Ragib Hasan (ragib@uab.edu).

University of Cincinnati

Visiting Assistant Professor

The School of Information Technology (SoIT) at the University of Cincinnati (UC) seeks to hire two Visiting Assistant Professors to teach courses in the areas of Cybersecurity, IT Infrastructure, Human Computer Interaction, Applied Machine Learning and Intelligence, or Software Application Development as they relate to Information Technology. For full job description and details on how to apply online, please visit https://jobs.uc.edu and search keyword: 95288.











Assistant Professor, Data Science - Applied Mathematics and Statistics, College of Engineering and Applied Sciences

Location: Stony Brook, NY **Open Date:** Feb 27, 2024

Deadline: Apr 30, 2024 at 11:59 PM Eastern Time

Description

Stony Brook University's Department of Applied Mathematics and Statistics invites applicants for a tenure-track faculty position at the Assistant Professor level with an expected start date of Fall 2024. Exceptionally qualified candidates in all areas of statistics and data science are invited to apply. The ideal candidate will have superb communication skills that enable effective collaboration, mentoring, and teaching.

The selected candidate will be responsible for teaching and conducting scholarly research, and service to the department and Stony Brook University. The Department values diversity and seeks candidates who can contribute to a welcoming climate for all students.

Anticipated Start Date: Fall 2024

Qualifications

Required Qualifications:

Ph.D. (or foreign equivalent) in Statistics, Data Science, Applied Mathematics, Computer Science, or a related field and should have a strong record of scholarly research.

Preferred Qualifications

Candidates with demonstrated excellence in teaching. High potential for leading an outstanding research program and securing research support. Evidence of expertise in data science, experience with data visualization tools, cloud services, and/or relational databases.

Application Instructions

To apply, visit https://apptrkr.com/5062164.

Applications received by March 31, 2024 will receive full consideration. Candidates who apply on or after April 1, 2024 will be considered on a rolling basis until the position is filled. The below documents are required and must be submitted through Interfolio.

- · Cover Letter
- Curriculum Vitae
- Research Statement
- Teaching Statement
- · Three letters of recommendation

All application materials must be submitted online. Please use the Apply Now button to begin your application. For technical support, visit Interfolio's Support Site (https://support.interfolio.com/) or reach out to their Scholar Service Team at help@interfollio.com or (877) 997-8807.

For questions regarding this position, please contact search chair, Professor Wei Zhu at http://wei.zhu@stonybrook.edu.

Department Description:

The Department of Applied Mathematics and Statistics is home to one of the largest undergraduate programs on campus and is a national leader in training students in applied mathematics and statistics, with a BS program that has been ranked within the top 5 in the USA. The Department has MS and PhD programs with 200-300 graduate students. The Department currently has 25-30 full-time faculty and lecturers, with many award-winning researchers and distinguished faculty. The Department faculty have significant collaborations with interdisciplinary centers on and off campus, including the Institute for AlDriven Discovery and Innovation, the Institute of Advanced Computational Science (IACS), the Laufer Center for Physical and Quantitative Biology, the Institute for Engineering-Driven Medicine, the Center of Excellence in Wireless and Information Technology (CEWIT), Brookhaven National Labs, and the Cold Spring Harbor Laboratory.

Special Notes

This is a tenure-track position. FLSA Exempt position, not eligible for the overtime. Internal and external search to occur simultaneously.

The selected candidate must successfully clear a background investigation.

In accordance with the Title II Crime Awareness and Security Act, a copy of our crime statistics is available upon request. It can also be viewed online at the University Police website at http://www.stonybrook.edu/police.

Stony Brook University is committed to excellence in diversity and the creation of an inclusive learning, and working environment. All qualified applicants will receive consideration for employment without regard to race, color, national origin, religion, sex, pregnancy, familial status, sexual orientation, gender identity or expression, age, disability, genetic information, veteran status and all other protected classes under federal or state laws.



UC San Diego

Associate/Full Professor (tenured): Broad Area in Data Science (HDSI)

UC San Diego invites applications for an Associate/Full Professor (tenured) in the Halicioğlu Data Science Institute (HDSI). We seek outstanding candidates with extensive experience from across all areas of Data Sciences. Areas of particular interest include Artificial Intelligence Foundations, Database Systems, and Intelligent Systems & Applications. This position involves teaching university students at both the undergraduate and graduate levels.

For additional details or to apply, please see https://apptrkr.com/5122116.

University of Iowa

Postdoctoral Research Scholar

I am seeking applications for a **post-doctoral scholar** at the University of Iowa. We study extensibility and modularity in high-level typed functional programming languages. The post-doctoral scholar will contribute to an NSF-funded project exploring a new semantic foundation for type classes and type families in Haskell. Their work will include formalizing the new approach in Agda, implementing it in GHC, and evaluating that implementation.

A PhD in computer science or a closely related field, with a background in programming languages, is required. The ideal candidate will have experience with Haskell programming, including the use of type classes and families, or experience with theorem proving in Agda.

This is a one-year position with a starting salary of \$58,179, and may be extended for up to two additional years. The position will start in Summer 2024, and will remain open until filled.

For more details, and to apply, please visit https://cs.uiowa.edu/~jgmorrs/postdoc.html.

University of Michigan

Post-Doc in Natural Language
Processing (NLP)

Research Fellow Job#240982

Position available immediately in the LAnguage Understanding and generatioN researCH (LAUNCH) group at the Artificial Intelligence Laboratory, CSE, University of Michigan, Ann Arbor. Under supervision of Dr. Lu Wang, PostDoc will have the opportunity to work on a wide variety of NLP topics including (but not limited to): narrative understanding, natural language generation, and Al alignment.

Responsibilities include performing research, publishing the results, providing technical guidance on projects for graduate and undergraduate students, and assisting in research proposal writing. Interested candidates should visit https://web.eecs.umich.edu/~wangluxy/ for more information on the research group and current projects.

PhD in CS or related fields, with demonstrated interest in NLP is required. Submit a statement of interest, CV, two representative publications and two contacts (one is PhD advisor) who can provide references for the applicant. Must possess valid work authorization and pass a background screening if selected. Salary range - \$70,000-\$75,000.

The University of Michigan is an equal opportunity/affirmative action employer.

University of Virginia

University of Virginia Department of Computer Science Teaching Track Academic General Faculty Positions

The Department of Computer Science at the University of Virginia seeks applications for one or more teachingtrack academic general faculty positions to begin in August 2024 and beyond. Academic general faculty positions are described fully in the policy PROV-004: Employment of Academic General Faculty Members. Candidates of any rank will be considered. We seek applicants who share our interest and enthusiasm for excellence in computing science education to join our department of 62 faculty, including 18 teaching faculty. We are especially seeking faculty who can teach courses in computer organization. systems, theory, software engineering, databases, cloud computing, mobile computing, and HCI. Rank is dependent upon experience and qualifications.

The department is committed to creating and benefiting from an environment where a diverse group of capable, inspired individuals interact and collaborate to learn and advance knowledge without barriers.



After an initial period, General Faculty may be reappointed for a three-year term or longer. University policies ensure that General Faculty benefit from opportunities for professional development, and there is a well-defined promotion path. General Faculty receive departmental support for their teaching and scholarship activities.

The University of Virginia is annually ranked as one of the premier public institutions in the United States. The University is located in Charlottesville, VA a picturesque and vibrant small city perennially ranked as one of the best places to live in the U.S. More information about town, the school, faculty benefits and other topics can be found at https://provost.virginia.edu/subsite/faculty-affairs/new-faculty-candidate-resources.

Qualifications

Candidates for a General Faculty position at the rank of Assistant, Associate or full Professor must, by the time the position starts, have a PhD in computer science or a related discipline. They must have an interest in and ability to teach a broad set of courses in our undergraduate curriculum. Graduate-level teaching may possibly be included. Faculty will have service responsibilities. The department strongly values scholarship activities by General Faculty. Scholarship in computing education or other areas of computing research is expected for promotion.

Candidates for a General Faculty position at the Lecturer, Senior Lecturer or Distinguished Lecturer rank must have a Master's degree or equivalent experience in computer science or a

related discipline. Lecturers will usually teach undergraduate courses but may also have the opportunity to teach more specialized advanced courses. Lecturers will have fewer expectations for service activity and will not be required to pursue scholarship.

Application Instructions

Apply online at *apply.interfolio*. *com/131012*. Include the following required documents in your application. The application materials must address your motivation and qualifications for a General Faculty position like this that focuses largely on computing education rather than a more common tenure-track position that has a much stronger research component.

- A cover letter
- Curriculum vita
- Statement describing your teaching practices designed to create a residential learning environment for core computer science courses that are highly effective and are marked by the free and collegial exchange of ideas.
- Statement of proposed scholarship activities appropriate for General Faculty positions (only for applications at the professorial rank, not for the lecturer ranks.
- Statement describing demonstrated contributions to fostering inclusive practices that create climates in which all stakeholders can achieve their maximum potential, please focus on skills and experiences, not personal beliefs and opinions.

 You will also request 3-5 references directly in Interfolio by providing names and contact information in the application. These reference requests will be generated immediately once you submit your application.

The university will perform background checks on all new hires prior to employment. This position will also require an Education Verification.

Review of completed applications will begin April 15, 2024.

For questions about the position, please contact Dr. Tom Horton, Associate Professor, at horton@virginia.edu.

For questions about the application process, please contact Richard K. Haverstrom, Faculty Search Advisor, at *rkh6j@virginia.edu*.

The University of Virginia, including the UVA Health System which represents the UVA Medical Center, Schools of Medicine and Nursing, UVA Physicians Group and the Claude Moore Health Sciences Library, are fundamentally committed to the diversity of our faculty and staff. We believe diversity is excellence expressing itself through every person's perspectives and lived experiences. We are equal opportunity and affirmative action employers. All qualified applicants will receive consideration for employment without regard to age, color, disability, gender identity or expression, marital status, national or ethnic origin, political affiliation, race, religion, sex, pregnancy, sexual orientation, veteran



or military status, and family medical or genetic information.

The University of Virginia offers confidential Dual Career Services to partners of incoming faculty candidates. To learn more, please visit www. dualcareer.virginia.edu



Teaching Faculty II / III

The College of Engineering & Applied Science at the University of Wisconsin-Milwaukee invites applications for a Teaching Faculty II or III (with the level to be determined based on years of experience and other qualifications) working in the Department of Computer Science in the College of Engineering and Applied Science, University of Wisconsin Milwaukee. We promote excellence through diversity and encourage all qualified individuals to apply.

To see full job posting and submit application package:https://apptrkr.com/5169690.

To ensure consideration, applications must be submitted by 05/16/2024. Applications submitted after 05/16/2024 may not be reviewed.