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 Edition DOI: [10.1145/3430581](https://doi.org/10.1145/3430581)

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Submit to AI Matters!

We're accepting articles and announcements now for the next issue. Details on the submission process are available at <http://sigai.acm.org/aimatters>.













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Welcome to AI Matters 6(2)

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DOI: [10.1145/3430581.3430582](https://doi.org/10.1145/3430581.3430582)

Issue overview

Welcome to the second issue of the sixth volume of the AI Matters Newsletter.

We open with the annual report of SIGAI by our new leadership team. We then bring you a brief report on upcoming SIGAI Events and Conference Reports by Louise Dennis, our new conference coordination officer. In our regular Education column, Todd Neller presents a retrospective of an initiative for mentoring undergraduate research in AI that has been going on since 2014. In the Policy column, Larry Medsker covers ongoing discussions on AI policy issues, for example with respect to ethical implications on Facial Recognition software and surveillance technologies to track the coronavirus pandemic. We end the issue with our regular column on AI generated crosswords from Adi Botea.

Special Issue: AI For Social Good

Recognizing the potential of AI in solving some of the most pressing challenges facing our society, we are excited to announce that the next Newsletter of AI Matters will be a special issue on the theme of “AI for Social Good.” We solicit articles that discuss how AI applications and/or innovations have resulted in a meaningful impact on a societally relevant problem, including problems in the domains of health, agriculture, environmental sustainability, ecological forecasting, urban planning, climate science, education, social welfare and justice, ethics and privacy, and assistive technology for people with disabilities. We also encourage submissions on emerging problems where AI advances have the potential to influence a transformative change, and perspective articles that highlight the challenges faced by current standards of AI to have a societal impact and opportunities for future research in this area. More details to be coming soon on <http://sigai.acm.org/aimatters>. Please get in touch with us if you have any questions!

Submit to AI Matters!

Thanks for reading! Don't forget to send your ideas and future submissions to *AI Matters*! We're accepting articles and announcements now for the next issue. Details on the submission process are available at <http://sigai.acm.org/aimatters>.



Iolanda Leite is co-editor of AI Matters. She is an Associate Professor at the School of Electrical Engineering and Computer Science at the KTH Royal Institute of Technology in Sweden. Her research interests are in the areas of Human-Robot Interaction and Artificial Intelligence. She aims to develop autonomous socially intelligent robots that can assist people over long periods of time.



Anuj Karpatne is co-editor of AI Matters. He is an Assistant Professor in the Department of Computer Science at Virginia Polytechnic Institute and State University (Virginia Tech). He leads the Physics-Guided Machine Learning (PGML) Lab at Virginia Tech, where he develops novel ways of integrating scientific knowledge (or physics) with machine learning methods to accelerate scientific discovery from data.



SIGAI Annual Report: July 1 2019 – June 30 2020

Sanmay Das (elected; [ACM SIGAI Chair](#))

Nicholas Mattei (elected; [ACM SIGAI Vice-Chair](#))

John P. Dickerson (elected; [ACM SIGAI Secretary/Treasurer](#))

Sven Koenig (elected; [ACM SIGAI Past-Chair](#))

Louise Dennis (appointed; [ACM SIGAI Conference Coordination Officer](#))

Larry Medsker (appointed; [ACM SIGAI Public Policy Officer](#))

Todd Neller (appointed; [ACM SIGAI Education Activities Officer](#))

Iolanda Leite (appointed; [ACM SIGAI Newsletter Editor-in-Chief](#))

Anuj Karpatne (appointed; [ACM SIGAI Newsletter Editor-in-Chief](#))

DOI: [10.1145/3430581.3430583](#)

Introduction

It has been a first year full of unexpected challenges for the new officers of SIGAI! Along with the election of a new leadership team, we began the year with many changes, including integrating a new leadership team, changes in several of the appointed officers, and of course the global pandemic which has radically altered many of our activities! Of particular note, we are excited to welcome on board Louise Dennis as the new conference coordination officer, Anuj Karpatne as a new co-editor for AI Matters, and Alan Tsang as the new information officer, taking over from Michael Rovatsos, Amy McGovern, and Hang Ma respectively. We are very grateful to Michael, Amy, and Hang for years of excellent service to SIGAI! While we were working on several new initiatives, like everyone else, the Covid-19 pandemic changed the nature of what we were able to do and what we had to focus on. Nevertheless, we managed to get several of these initiatives off the ground, and were lucky in that SIGAI was well-positioned both financially and in terms of our rapport with many communities.

Meetings

ACM's Meetings as a whole have been greatly impacted by the ongoing Covid-19 crisis. For SIGAI, this started with the last-minute cancellations of IUI 2020 and HRI 2020 (with HRI, despite the short notice, heroically managing to pull together an online version of the conference). Fortunately, ACM SIGAI's funds were

robust enough that we could successfully absorb our share of the costs of these cancellations while continuing with the SIG's other activities. Since the crisis began to unfold in February and March the ACM has been building up a store of expertise and support services for online conferences that are now available to conferences running in cooperation with, or sponsored by, ACM SIGAI.

ACM SIGAI sponsored the following conferences:

- IVA 2019
- WI 2019
- ASE 2019
- AIES 2020
- IUI 2020 (cancelled)
- HRI 2020 (moved online)

and it will sponsor the following conferences coming up in 2020 and 2021:

- ASE 2020
- IVA 2020
- CSCS 2020
- WI 2020
- IUI 2021

ACM SIGAI approved the following in-cooperation requests from events covering a wide thematic and geographical range across the international AI community:

- RecSys 2020
- CSCS 2019

- K-CAP 2019
- AIVR 2019
- BIOSTEC 2020
- ICAART 2020
- ICPRAM 2020
- ICEIS 2020
- AAMAS 2020
- IEA/AIE 2020
- MSR 2020
- DeLTA 2020
- IC3K 2020
- IJCCI 2020
- ROBOVIS 2020
- ICINCO 2020
- FDG 2020
- ICPRAM 2021
- BIOSTEC 2021
- ICAART 2021
- IEA/AIE 2021

ACM SIGAI has continued to work with conferences to encourage participation in the ACM Carbon Offsetting scheme but this is necessarily somewhat on hold.

Financial Support

In 2019 ACM SIGAI introduced a student travel award scheme intended to help fund conference attendance for student ACM members. This extended long-standing collaborations with specific conferences to fund student attendance. This funding is being targeted towards conferences sponsored by, or in-cooperation with, SIGAI and at students presenting work at those conferences - though other applications are exceptionally considered. Sixteen students were funded by this scheme primarily to attend IVA 2019 and ASE 2019. The majority of these students were studying at US institutions.

As part of a long-standing arrangement, we also helped fund the attendance of six students to the AAAI Doctoral Consortium. Most of these were studying in Europe, though one was based in Australia and one in Canada.

While the nationalities of the students we have given travel awards to is more diverse than

the institutions where they are studying, the vast majority have still come from the USA, Canada or Europe. At present, understandably, we have very few applications coming in through the scheme (only one in all of 2020 to date). Once conference travel is more widespread again we will revisit in particular the way the scheme is advertised in the hope that we can support a wider range of conferences.

We also ran a second round of the AI Activities Fund call for proposals, focused on outreach and other activities that can be done entirely virtually and received several strong proposals. We are in the process of finalizing funding decisions at the time of writing, and expect to fund 4 or 5 proposals with between \$1000 – \$2000 of support going to each one that is funded. These awarded activities will be writing reports in AI Matters after completion of the work.

Awards

ACM SIGAI sponsors the ACM SIGAI Autonomous Agents Research Award, an annual award for excellence in research in the area of autonomous agents. The recipient is invited to give a talk at the International Conference on Autonomous Agents and Multiagent Systems (AAMAS). The 2020 ACM SIGAI Autonomous Agents Research Award was presented (virtually) at AAMAS 2020 in Auckland, New Zealand to Munindar Singh, the Alumni Distinguished Professor of Computer Science at North Carolina State University, for his extensive contributions to our understanding of social interaction and autonomy in Artificial Intelligence through his seminal work on interaction protocols, norms, and trust in multiagent systems.

ACM SIGAI also sponsors the ACM SIGAI Industry Award for Excellence in AI, a new annual award which is given annually to an individual or team in industry who created a fielded AI application in recent years that demonstrates the power of AI techniques via a combination of the following features: novelty of application area, novelty and technical excellence of the approach, importance of AI techniques for the approach and actual and predicted societal impact of the application. The inaugural ACM SIGAI Industry

Award for Excellence in AI was presented at the International Joint Conference on AI (IJCAI) 2019 in Macau to the Real World Reinforcement Learning Team from Microsoft. The process for the 2020 award and the IJCAI 2020 conference was severely impacted due to the COVID-19 outbreak. Hence, there is no award for 2020 but the committee is working hard for the 2021 award.

ACM SIGAI also recently created, jointly with AAAI, the AAAI/ACM SIGAI Doctoral Dissertation Award to recognize and encourage superior research and writing by doctoral candidates in AI. This new annual award will be presented at the AAAI Conference on AI in the form of a certificate and is accompanied by the option to present the dissertation at the AAAI conference as well as to submit a six-page summary to both the AAAI proceedings and the ACM SIGAI newsletter. We received 20 nominations for the inaugural award and selection is nearly complete. The award will be presented at AAAI 2021, for dissertations completed in the 2019-2020 academic year.

Public Policy and AI Ethics

Within ACM, we work with the ACM US Technology Policy Committee (USTPC) through the membership of our public policy officer Larry Medsker. He includes selected USTPC issues in his ACM SIGAI Public Policy blog posts. In 2019 he represented SIGAI in his dinner presentation on AI public policy and ethics at the USTPC board's annual meeting. The SIGAI Public Policy Officer participates in workshops and briefings in Washington, DC, that bring together legislators, staffers, corporate representatives, and non-profit organizations for discussions of policy making related to AI.

The bi-monthly posts on the AI Matters Public Policy blog in the past year commented on a wide variety of current topics, including:

- AI and face recognition and the USTPC public statement on face recognition
- A series of blogs on fundamentals of bias, discrimination, and fairness
- Human-centered design of AI systems
- AI ethics impacts on policymaking
- The role of data in AI and policy

- AI policy on privacy, accountability, and transparency
- Policymaking for AI and the workforce of the future
- VISA exemption for international students
- Frameworks and guidelines for principles of AI
- Federal government guidance and strategies on AI policy
- G20 and European activities in AI and data
- Global race for AI dominance

Outside of ACM, our public policy officer has participated in the executive committee of the IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems. In June 2020, he became a Co-Editor-in-Chief for the new Springer Nature journal AI and Ethics.

Education Initiatives

It was another good year for expanding our Model AI Assignment archive (<http://modelai.gettysburg.edu/>). Our EAAI-2020 track was again successful, attracting 9 new accepted, peer-reviewed projects into our archive and presented at EAAI-2020 in New York, New York, USA on February 8 and 9 (<https://pages.mtu.edu/~lebrown/eaai/index.html>).

At EAAI, we announced our latest mentored undergraduate research challenge: AI for Gin Rummy competitive play under tight real-time constraints (<http://cs.gettysburg.edu/~tneller/games/ginrummy/eaai/>). Despite, or perhaps because of, the pandemic, we have had excellent participation with 50 mentors and students yielding 14 entries by the deadline on August 9th. We will be evaluating entries in the coming weeks, and hope to see a similarly good yield for the corresponding paper track at EAAI-21.

Following the success of the 2017 and 2018-2019 ACM SIGAI Essay Contest on the use of AI Technology we began preparation for the 2020-2021 version (to run during the school year). We are approaching this year with a renewed interest in the effects of AI Technology in Society in light of the changing world due to COVID-19. This year's contest is planned to

be run in conjunction with ACM SIGCSE to involve more students from across AI and computer science broadly. We completed publishing all 8 winners from the 2018-2019 in AI Matters with Volume 5, Issue 3, 2019 issue.

Newsletter

The ACM SIGAI newsletter is distributed via the ACM SIGAI mailing list but also openly available on the ACM SIGAI web-site (at sigai.acm.org/aimatters/). AI Matters features articles of general interest to the AI community. ACM SIGAI publishes four issues of its newsletter AI Matters per year. Due to the pandemic, in 2020 we are only planning to publish three issues.

In the past year, we added a new editor-in-chief, Anuj Karpatne, who came to the position after the anticipated departure of Amy McGovern. We also welcomed a new column editor, Louise Dennis, who took responsibility for the News and Events column, succeeding Michael Rovatsos.

The recurring columns in AI matters have included:

- AI Interviews (with interesting people from academia, industry, and government, led by the diversity officer),
- AI Amusements (including AI humor, cross-word puzzles, and games),
- AI Education (led by the education activities officer),
- AI Policy Issues (led by the public policy officer),
- AI Buzzwords (which explains new AI concepts or terms),
- AI Events (which includes conference announcements and reports, led by the conference coordination officer)
- AI Dissertation Abstracts and News from AI Groups and Organizations;
- AI Latest Research Trends (where we invite recent recipients of competitive grants to write about their latest research projects, currently led by the co-editors in chief).

We are planning an additional recurring column dedicated to diversity in AI. AI Matters also published the winning entries from the

2018 ACM SIGAI Student Essay Contest on the Responsible Use of AI Technologies.

Job Fair

AAAI and ACM SIGAI have partnered to run the popular AAAI/ACM SIGAI Job Fair for the last six years. In lockstep with the growth of AAAI and the growth of the greater artificial intelligence and machine learning (AI/ML) community, our once-small job fair also grew. At AAAI-20, thirty-eight companies and universities formally attended, typically with a booth, team of recruiters, swag, and other representatives, increasing from twenty-six companies during the job fair's previous run in 2019, and twenty-one companies in the year prior to that. In 2021, Michael Albert (U Virginia), John Dickerson (Maryland), and Matthew Taylor (Alberta) will co-run the job fair which will be virtual-only for the first time. We own a dedicated domain at <https://aaaijobfair.com/> for the job fair. We typically provide a link on that site through which job-seekers, students, post-docs, practitioners, and maybe even a few faculty, can upload their resumes or CVs. We then share that data and contact information for the job-seekers with participants on the other side: prospective employers. This past year was no different, and we connected many hundreds of job-seekers to employers at the job fair.

Planning for the Future

The nature of the pandemic has changed many of our priorities, and also, of course, made it difficult for many of our volunteers to serve at the level of energy they have in the past, given the many different demands on their time. Nevertheless, we are excited by the direction of SIGAI. In particular, the new awards and outreach activities to both students, job-seekers, and the broader community we have worked on over the last few years. We also have several successful activities that are joint with other organizations, including many conferences co-sponsored with other ACM SIGs, conferences, the doctoral consortium, and the new dissertation award with AAAI, and continue to work with IFAA-MAS and IJCAI on joint agreements related to some of our major awards. We view such collaborations as a highlight and a strength,

since they benefit the greater AI and computing communities. In the coming year, an area that we want to continue to focus on is improving our reach in industry and those interested in applied AI more generally. In addition, we are working to revamp our website and social media presence to offer more opportunities to engage with SIGAI, and more outreach into the broader community of people interested in Artificial Intelligence!



Events

Louise A. Dennis (University of Manchester; louise.dennis@manchester.ac.uk)
DOI: [10.1145/3430581.3430584](https://doi.org/10.1145/3430581.3430584)

This section features information about upcoming events relevant to the readers of AI Matters, including those supported by SIGAI. We would love to hear from you if you are organizing an event and would be interested in cooperating with SIGAI. For more information about conference support visit sigai.acm.org/activities/requesting-sponsorship.html.

3rd International Conference on Artificial Intelligence & Virtual Reality (AIVR 2020)

Virtual online event, December 14-18, 2020
<http://ieee-aivr.org>

IEEE AIVR is a unique event, addressing researchers and industries from all areas of AI as well as Virtual, Augmented, and Mixed Reality. It provides an international forum for the exchange between those fields, to present advances in the state of the art, identify emerging research topics, and together define the future of these exciting research domains. Due to the COVID-19 situation, the conference will be hosted virtually this year and some parts will be streamed online for free. Please refer to the conference's website for information about registration and the program.

The 34th International Conference on Industrial, Engineering & Other Applications of Applied Intelligent Systems (IEA/AIE 2021)

Kuala Lumpur, Malaysia, July 26-29, 2021
<https://ieaaie2021.wordpress.com/>

IEA/AIE 2021 emphasizing in employing studies in theory and practices of Artificial Intelligence and machine learning for applied intelligent systems, to solve real-life problems in all areas including science, industry, automation and robotics, business and finance, medicine and biomedicine, bioinformatics, cyberspace, and human-machine interactions. The proceedings will be published by Springer

Lecture notes in Artificial Intelligence.

Submission deadline December 15, 2020

Registration April 1, 2021

Camera Ready April 1, 2021

Conference Sessions July 26-29, 2021



Louise Dennis is the Conference Coordination Officer for ACM SIGAI, and a faculty member at the University of Manchester. Her research is in Verification of Autonomous Systems, Cognitive Agents and Machine Ethics. Contact her

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Conference Reports

Louise A. Dennis (University of Manchester; louise.dennis@manchester.ac.uk)

DOI: [10.1145/3430581.3430585](https://doi.org/10.1145/3430581.3430585)

This section features brief reports from recent events sponsored or run in cooperation with ACM SIGAI.

13th International Joint Conference on Biomedical Engineering Systems and Technologies (BIOSTEC 2020)

Valletta, Malta from 24-26 February, 2020

<http://www.biostec.org/?y=2020>

BIOSTEC 2020 (13th International Joint Conference on Biomedical Engineering Systems and Technologies) was held in Valletta, Malta from 24-26 February, 2020. It was sponsored by the Institute for Systems and Technologies of Information, Control and Communication (INSTICC), and was also technically co-sponsored by the IEEE Engineering in Medicine and Biology Society. BIOSTEC 2020 was organized in cooperation with the ACM SIGAI and a number of other ACM SIGs and national societies.

The purpose of BIOSTEC is to bring together researchers and practitioners, including engineers, biologists, health professionals and informatics/computer scientists, interested in both theoretical advances and applications of information systems, artificial intelligence, signal processing, electronics and other engineering tools in knowledge areas related to biology and medicine.

BIOSTEC 2020 is composed of five co-located complementary conferences, each specialized in a different knowledge area. Namely: BIODEVICES - 13th International Conference on Biomedical Electronics and Devices; BIOIMAGING - 7th International Conference on Bioimaging; BIOINFORMATICS - 11th International Conference on Bioinformatics Models, Methods and Algorithms; BIOSIGNALS - 13th International Conference on Bio-inspired Systems and Signal Processing; and HEALTHINF - 13th International Conference on Health Informatics.

BIOSTEC received 363 paper submissions from 55 countries. To evaluate each submission,

a double-blind paper review was performed by the Program Committee. After a stringent selection process, 23.42% of the papers were published and presented as full papers. Four invited talks were delivered by internationally distinguished speakers, namely: Roy Ruddle, University of Leeds, United Kingdom; Helena Canhão, Universidade NOVA de Lisboa, Portugal; Petia Radeva, Universitat de Barcelona, Spain; and Silvana Quaglini, Dept. of Electrical, Computer and Biomedical Engineering, University of Pavia, Italy

The BIOSTEC program also included two workshops, four special sessions, a tutorial and a doctoral consortium: COMP2CLINIC: Biomedical Researchers & Clinicians Closing The Gap Between Translational Research And Healthcare Practice - C2C (workshop), chaired by Jason Moore, Carly Bobak, Kristine Giffin and Marek Svoboda; Best Practices for Scaling-Up Digital Innovations in Healthcare (workshop) - Scale-IT-up, chaired by Hannes Schlieter and Tobias Kowatsch; Designing Future Health Innovations as Needed – ClinMed (special session), chaired by Lionel Pazart and Robert Picard; Non-invasive Diagnosis and Neuro-stimulation in Neurorehabilitation Tasks – NDNSNT (special session), chaired by Vladimir Kublanov, Yury Kistenev and Zafar Yuldashev; Mining Self-reported Outcome Measures, Clinical Assessments, and Non-invasive Sensor Data Towards Facilitating Diagnosis, Longitudinal Monitoring, and Treatment – SERPICO (special session), chaired by Athanasios Tsanas, Andreas Triantafyllidis, Georgios Theodorakopoulos and Siddharth Arora; Machine Learning and Deep Learning Improve Preventive and Personalized Healthcare - Cognitive Health IT (special session), chaired by Tahir Hameed and Syed Ahmad Chan Bukhari; BioC++ - solving daily bioinformatic tasks with C++ efficiently (tutorial), lectured by René Rahn and Marcel Ehrhardt; and the doctoral consortium, chaired by Andres Diaz Lantada. Additionally, six "Best Paper Awards", four "Best Student Paper Awards", five "Best Poster Awards" and a "Best Indus-

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trial Paper Award” were conferred at the conference venue.

The next edition of BIOSTEC will be held in Vienna, Austria on 11-13 February, 2021.

12th International Conference on Agents and Artificial Intelligence (ICAART 2020)

Valletta, Malta from 22-24 February, 2020
<http://www.icaart.org/?y=2020>

ICAART 2020 (12th International Conference on Agents and Artificial Intelligence) was held in Valletta, Malta from 22-24 February, 2020. It was sponsored by the Institute for Systems and Technologies of Information, Control and Communication (INSTICC), and was also technically co-sponsored by the IEEE Computational Intelligence Society. ICAART 2020 was organized in cooperation with the ACM SIGAI several national societies, and the European Association for Artificial Intelligence (EurAi).

The purpose of the International Conference on Agents and Artificial Intelligence is to bring together researchers, engineers and practitioners interested in the theory and applications in the areas of Agents and Artificial Intelligence.

ICAART received 276 paper submissions from 54 countries. To evaluate each submission, a double-blind paper review was performed by the Program Committee. After a stringent selection process, 16.3% of the papers were published and presented as full papers. Four invited talks were delivered by internationally distinguished speakers, namely: Carles Sierra, IIIA-CSIC, Spain; Marie-Christine Rousset, Université Grenoble-Alpes and Institut Universitaire de France, France; Bart Selman, Cornell University, United States; Rineke Verbrugge, Bernoulli Institute, University of Groningen, Netherlands

The ICAART program also included the following Special Sessions: Human-centric Applications of Multi-agent Technologies – HAMT, chaired by Yasushi Kambayashi; Natural Language Processing in Artificial Intelligence – NLPinAI, chaired by Roussanka Loukanova; and Artificial Intelligence and Digital Heritage: Challenges and Opportunities – ARTIDIGH,

chaired by Andreas Weber, Marieke van Erp and Maarten Heerlien. Additionally, a “Best Paper Award”, a “Best Student Paper Award”, a “Best Poster Award” and a “Best Industrial Paper Award” were conferred at the conference venue.

The next edition of ICAART will be held in Vienna, Austria on 4-6 February, 2021.

9th International Conference on Pattern Recognition Applications and Methods (ICPRAM 2020)

Valletta, Malta from 22-24 February, 2020
<http://www.icpram.org/?y=2020>

ICPRAM 2020 (9th International Conference on Pattern Recognition Applications and Methods) was held in Valletta, Malta from 22-24 February, 2020. It was sponsored by the Institute for Systems and Technologies of Information, Control and Communication (INSTICC). ICPRAM 2020 was organized in cooperation with the ACM SIGAI - ACM Special Interest Group on Artificial Intelligence, the European Association for Signal Processing (EURASIP), a number of national societies, and endorsed by the International Association for Pattern Recognition (IAPR)

The International Conference on Pattern Recognition Applications and Methods is a major point of contact between researchers, engineers and practitioners on the areas of Pattern Recognition and Machine Learning, both from theoretical and application perspectives. Contributions describing applications of Pattern Recognition techniques to real-world problems, interdisciplinary research, experimental and/or theoretical studies yielding new insights that advance Pattern Recognition methods are especially encouraged.

ICPRAM received 102 paper submissions from 30 countries. To evaluate each submission, a double-blind paper review was performed by the Program Committee. After a stringent selection process, 22.55% of the papers were published and presented as full papers. Three invited talks were delivered by internationally distinguished speakers, namely: Andrea Cavallaro, Queen Mary University of London, United Kingdom (Distinguished IAPR Speaker); Cristina Conati, University of British

Columbia, Canada; Max Welling, University of Amsterdam, Netherlands

The ICPRAM program also included the following tutorial: An Introduction to Biometrics, lecturer by Rangachar Kasturii. Additionally, a "Best Paper Award", a "Best Student Paper Award", a "Best Poster Award" and a "Best Industrial Paper Award" were conferred at the conference venue.

The next edition of ICPRAM will be held in Vienna, Austria on 4-6 February, 2021.



Louise Dennis is the Conference Coordination Officer for ACM SIGAI, and a faculty member at the University of Manchester. Her research is in Verification of Autonomous Systems, Cognitive Agents and Machine Ethics. Contact her

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AI Education Matters: EAAI Mentored Undergraduate Research Challenges Past, Present, and Future

Todd W. Neller (Gettysburg College; tneller@gettysburg.edu)

DOI: [10.1145/3430581.3430586](https://doi.org/10.1145/3430581.3430586)

Introduction

In this column, we recount the history of EAAI mentored undergraduate research challenges from 2014 through the present and share a vision of how such offerings may become more diverse and engage a broader range of faculty mentors and undergraduate researchers.

Unlike many academic disciplines, Computer Science undergraduate majors currently are not usually required to take or even offered a research methods course. Even so, many graduate schools desire to admit graduate students with undergraduate research experience. The EAAI Symposium has historically affirmed the value of mentored undergraduate research as an important part of undergraduate AI education. It has expressed this value through the support of a number of mentored undergraduate research challenges, described below.

2014/2015: Parameterized Poker Squares

In 2014/2015, the first mentored undergraduate challenge was called “[The EAAI NSG Challenge: Parameterized Poker Squares](#)”. DARPA had a history of “[Grand Challenges](#)”, so our acronym “NSG” was a tongue-in-cheek modest nod to DARPA’s Grand Challenges, noting that undergraduate research challenges, while non-trivial, would be Not-So-Grand.

[Poker Squares](#) is a folk sequential placement optimization game. Using a shuffled 52-card French deck, the rules of ([Morehead & Mott-Smith, 1949](#), p. 106) read as follows:

Turn up twenty-five cards from the stock, one by one, and place each to best advantage in a tableau of five rows of five cards each. The object is to make as high a total score as possible, in the ten Poker hands formed by the five rows and five columns.

Two predominant scoring systems, American and British, assign point values to achieving row/column Poker hands. Parameterized Poker Squares was a generalization where the scoring system was supplied to players at the beginning of a game and players were challenged to form play strategy under time constraints.

In our contest, AI players were given 5 minutes to learn play strategy from a given scoring system, some fixed and some generated at random within different design constraints. Players then were required to play such strategies for 100 unknown shuffled decks with a time limit of 30 seconds for reasoning during the play of each deck.

The contest drew participation of 7 teams with [mixed results](#) and [4 papers accepted for publication through peer review](#).

2016/2017: Widely-Accessible AI Robotics Tasks

Zachary Dodds organized the second mentored undergraduate research challenge, “[Widely-Accessible AI Robotics Tasks](#)”. Rather than create a *competition*, each *design challenge* entry was awarded an accolade for a unique virtue of its contribution. [Contest details](#) focus on three design tradeoffs:

- AI sophistication: more is better
- Wide adaptability: easier is better
- Compelling contexts and toolsets: the more creative and more authentic, the better

The challenge attracted [6 entries with corresponding abstracts/papers and presentations at EAAI-17](#).

2018/2019: Birds of a Feather

[Birds of a Feather](#) was offered as a research challenge in [this AI Education Matters column](#)

in the summer of 2016.

The [2018/2019 mentored undergraduate research challenge](#) was for students to research some aspect of this newly-designed solitaire card game and publish their research. Most students focused on search solution efficiency and state unsolvability detection/prediction. This resulted in [7 accepted peer-reviewed papers](#) and [1 poster](#).

Current 2020/2021 Challenge: Gin Rummy

[Gin Rummy](#) is one of the most popular 2-player card games played with a standard 52-card deck. Ranks run from aces low to kings high. The object of the game is to be the first player to score 100 or more points accumulated through the scoring of individual hands. In this [Gin Rummy mentored undergraduate research challenge](#), students develop AI players to play games within a time constraint of 30 seconds per player per game (consisting of multiple hands) using North American gin and undercut bonuses of 25 points each.

At time of writing, 14 teams of 50 total mentors and undergraduate students have submitted AI players for competition evaluation. Corresponding papers are already trickling in more than a week in advance of the submission deadline. This is our highest participation rate to date and bodes well for the future of these endeavors.

Looking Forward

It is clear that there is a consistent recognition of the value of mentored undergraduate research opportunities in our AI Education community. Perhaps the next best step is to establish a committee and workflow for consistent offering of diverse challenges each year with distributed and rotating responsibility. At time of writing, we are seeking volunteers to serve in organization, promotion, mentoring, and peer-review in this cyclic process.

Because the challenges have largely been organized by one primarily interested in Game AI, challenge problems have not tapped many of the diverse subfields of AI research. To engage a broader cross-section of faculty mentors and undergraduate students, it is neces-

sary to bring in additional faculty expertise and passion for designing mentored undergraduate research challenges.

One possible improvement would be to design and announce the next challenge well before the beginning of the academic year. This would allow students in both academic year courses (e.g. capstone research) and summer research programs to participate before the following fall deadline. While it is too late for this academic year, we envision a future organizational structure that would establish a regular calendar workflow to distribute the considerable work necessary to create and support these endeavors annually going forward.

Conclusion

Looking at the past and present, there is a consistent level of energy and engagement around the worthy task of mentoring undergraduate research skill. Our greatest challenge looking forward is to establish an organizational structure that feature diverse research topic areas from year to year and will operate with an annual rhythm that allows for both academic year and summer participation.

If you are interested, please email the author of this column with your CV, website, and a brief description of your interests in supporting our endeavors.

References

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AI Policy Matters

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DOI: [10.1145/3430581.3430587](https://doi.org/10.1145/3430581.3430587)

Abstract

AI Policy Matters is a regular column in *AI Matters* featuring summaries and commentary based on postings that appear twice a month in the *AI Matters* blog (<https://sigai.acm.org/aimatters/blog/>). We welcome everyone to make blog comments so we can develop a rich knowledge base of information and ideas representing the SIGAI members.

AI Data

Confusion in the popular media about terms such as algorithm and what constitutes AI technology cause critical misunderstandings among the public and policymakers. More importantly, the role of data is often ignored in ethical and operational considerations. Even if AI systems are perfectly built, low quality and biased data cause unintentional and even intentional hazards.

Language Models and Data

A generative pre-trained transformer GPT-3 is currently in the news. For example, James Vincent in the July 30, 2020, [article](#) in The Verge writes about GPT-3, which was created by [OpenAI](#). Language models, GPT-3 the current ultimate product, have ethics issues on steroids for products being made. Inputs to the system have all the liabilities discussed about Machine Learning and Artificial Neural Network products. The dangers of bias and mistakes are raised in some writings but are likely not a focus among the wide range of enthusiastic product developers using the open-source GPT-3. Language models suggest output sequences of words given an input sequence. Thus, samples of text from social media can be used to produce new text in the same style as the author and potentially can be used to influence public opinion. Cases have been found of promulgating incorrect grammar and misuse of terms based on

poor quality inputs to language models. An [article](#) by David Pereira includes examples and comments on the use of GPT-3. The [article](#) “GPT-3: an AI Game-Changer or an Environmental Disaster?” by John Naughton gives examples of and commentary on results from GPT-3.

Data Governance

A possible meta solution for policymakers to keep up with technological advances and AI data issues is [discussed](#) by Alex Woodie in “AI Ethics and Data Governance: A Virtuous Cycle.” He quotes James Cotton, who is the international director of the Data Management Centre of Excellence at [Information Builders’](#) Amsterdam office: “as powerful as the AI technology is, it can’t be implemented in an ethical manner if the underlying data is poorly managed and badly governed. It’s critical to understand the relationship between data governance and AI ethics. One is foundational for the other. You can’t preach being ethical or using data in an ethical way if you don’t know what you have, where it came from, how it’s being used, or what it’s being used for.”

USTPC in the News

The ACM’s US Technology Policy Committee ([USTPC](#)) was very active in July, 2020! The contributions and visibility of USTPC as a group and as individual members are very welcome and impressive. The following list has links to highly-recommended reading.

[Amicus Brief: USTPC Urges Narrower Definition of Computer Fraud and Abuse Act](#)

ACM’s USTPC filed an amicus curiae (“friend of the court”) brief with the United States Supreme Court in the landmark case of *Van Buren v. United States*. “Van Buren marks the first time that the US Supreme Court has reviewed the Computer Fraud and Abuse Act (CFAA), a 1986 law that was originally intended to punish hacking. In recent years, however, the CFAA has been used to crimi-

nally prosecute both those who access a computer system without permission, as well as those who have permission but exceed their authority to use a database once logged in.”

USTPC Statement On Face Recognition

(USTPC) has assessed the present state of facial recognition (FR) technology as applied by the government and private sector. The Committee concludes that, “when rigorously evaluated, the technology too often produces results demonstrating clear bias based on ethnic, racial, gender, and other human characteristics recognizable by computer systems. The consequences of such bias, USTPC notes, frequently can and do extend well beyond inconvenience to include profound injury, particularly to the lives, livelihoods and fundamental rights of individuals in specific demographic groups, including some of the most vulnerable populations in our society.” See the [NBC news article](#).

Barbara Simons Recipient of the 2019 ACM Policy Award

USTPC’s Barbara Simons, founder of USTPC predecessor USACM, is the recipient of the 2019 ACM Policy Award for “long-standing, high-impact leadership as ACM President and founding Chair of ACM’s US Public Policy Committee (USACM), while making influential contributions to improve the reliability of and public confidence in election technology. Over several decades, Simons has advanced technology policy by founding and leading organizations, authoring influential publications, and effecting change through lobbying and public education.” Congratulations, Barbara!

Potential New Issues

ACM urged Preservation of Temporary Visa Exemptions for Nonimmigrant Students, and Harvard filed a complaint for declaratory and injunctive relief. This issue may have dramatic impacts on university research and teaching.

Thank you, USTPC, for your hard work and representation of ACM to policymakers!

AI in Congress

Politico [reports](#) on two separate bills introduced on June 2. (See the section entitled “Artificial Intelligence: Let’s Do the Thing”.)

The National AI Research Resource Task Force Act. “The bipartisan, bicameral bill introduced by Reps. Anna Eshoo, (D-Calif.), Anthony Gonzalez (R-Ohio), and Mikie Sherrill (D-N.J.), along with companion legislation by Sens. Rob Portman (R-Ohio) and Martin Heinrich (D-N.M.), would form a committee to figure out how to launch and best use a national AI research cloud. Public and private researchers and developers from across the country would share this cloud to combine their data, computing power and other resources on AI. The panel would include experts from government, academia and the private sector.”

The Advancing Artificial Intelligence Research Act. “The bipartisan bill introduced by Senate Commerce Chairman Roger Wicker (R-Miss.), Sen. Cory Gardner (R-Colo.) and Gary Peters (D-Mich.), a founding member of the Senate AI Caucus, would create a program to accelerate research and development of guidance around AI at the National Institute of Standards and Technology. It would also create at least a half-dozen AI research institutes to examine the benefits and challenges of the emerging technology and how it can be deployed; provide funding to universities and nonprofits researching AI; and launch a pilot at the National Science Foundation for AI research grants.”

AI and Facial Recognition

Concerns About Facial Recognition: Discrimination, Privacy, and Democratic Freedom

While including ethical and moral issues, a broader list of issues is concerning to citizens and policymakers about face recognition technology and AI. Areas of concerns include accuracy; surveillance; data storage, permissions, and access; discrimination, fairness, and bias; privacy and video recording without consent; democratic freedoms, including right to choose, gather, and speak; and abuse of technology such as non-intended uses, hacking, and deep fakes. Used responsibly and ethically, face recognition can be valuable for finding missing people, responsible policing and law enforcement, medical uses, health-care, virus tracking, legal system and court uses, and advertising. Various guidelines by

organizations such as the [AMA](#) and legislation like [S.3284 – Ethical Use of Facial Recognition Act](#) are being developed to encourage the proper use of AI and face recognition. Some of the above issues do specifically require ethical analysis as in the following by [Yaroslav Kufinski](#):

1. Accuracy — FR systems naturally discriminate against non-whites, women, and children, presenting errors of up to 35% for non-white women.
2. Surveillance issues — concerns about “big brother” watching society.
3. Data storage — use of images for future purposes stored alongside genuine criminals.
4. Finding missing people — breaches of the right to a private life.
5. Advertising — invasion of privacy by displaying information and preferences that a buyer would prefer to keep secret.
6. Studies of commercial systems are increasingly available, for example an [analysis](#) of Amazon Rekognition.
7. Biases deriving from sources of unfairness and discrimination in machine learning have been identified in two areas: the data and the algorithms. Biases in data skew what is learned in machine learning methods, and flaws in algorithms can lead to unfair decisions even when the data is unbiased. Intentional or unintentional biases can exist in the data used to train FR systems.
8. New human-centered design approaches seek to provide intentional system development steps and processes in collecting data and creating high quality databases, including the elimination of naturally occurring bias reflected in data about real people.

Bias That Pertains Especially to Facial Recognition ([Mehrabi, et al.](#) and [Barocas et. al.](#))

1. Direct Discrimination: “Direct discrimination happens when protected attributes of individuals explicitly result in non-favorable outcomes toward them”. Some traits like race, color, national origin, religion, sex, family status, disability, exercised rights under CCPA, marital status, receipt of public assistance, and age are identified as sensitive

attributes or protected attributes in the machine learning world.

2. Indirect Discrimination: Even if sensitive or protected attributes are not used against an individual, indirect discrimination can still happen. For example, residential zip code is not categorized as a protected attribute, but from the zip code one might infer race, which is a protected attribute. So, “protected groups or individuals still can get treated unjustly as a result of implicit effects from their protected attributes”.
3. Systemic Discrimination: “policies, customs, or behaviors that are a part of the culture or structure of an organization that may perpetuate discrimination against certain subgroups of the population”.
4. Statistical Discrimination: In law enforcement, racial profiling is an example of statistical discrimination. In this case, minority drivers are pulled over more than compared to white drivers — “statistical discrimination is a phenomenon where decision-makers use average group statistics to judge an individual belonging to that group.”
5. Explainable Discrimination: In some cases, discrimination can be explained using attributes like working hours and education, which is legal and acceptable. In “the UCI Adult dataset, a widely-used dataset in the fairness domain, males on average have a higher annual income than females; however, this is because, on average, females work fewer hours than males per week. Work hours per week is an attribute that can be used to explain low income. If we make decisions without considering working hours such that males and females end up averaging the same income, we could lead to reverse discrimination since we would cause male employees to get lower salary than females.
6. Unexplainable Discrimination: This type of discrimination is not legal as explainable discrimination because “the discrimination toward a group is unjustified”.

How to Discuss Facial Recognition

Recent controversies about FR mix technology issues with ethical imperatives and ignore that people can disagree on which are the “correct” ethical principles. A recent ACM

tweet on FR and face masks was interpreted in different ways and ACM issued an official clarification. A question that emerges is if AI and other technologies should be, and can be, banned rather than controlled and regulated. In early June, 2020, IBM CEO Arvind Krishna said in a letter to Congress that IBM is exiting the facial recognition business and asking for reforms to combat racism: “IBM no longer offers general purpose IBM facial recognition or analysis software. IBM firmly opposes and will not condone uses of any technology, including facial recognition technology offered by other vendors, for mass surveillance, racial profiling, violations of basic human rights and freedoms, or any purpose which is not consistent with our values and Principles of Trust and Transparency,” Krishna said in his letter to members of congress, “We believe now is the time to begin a national dialogue on whether and how facial recognition technology should be employed by domestic law enforcement agencies.”

Policy and AI Ethics

The Alan Turing Institute Public Policy Programme

Among the complexities of public policy making, the new world of AI and data science requires careful consideration of ethics and safety in addressing complex and far-reaching challenges in the public domain. Data and AI systems lead to opportunities that can produce both good and bad outcomes. Ethical and safe systems require intentional processes and designs for organizations responsible for providing public services and creating public policies. An increasing amount of research focuses on developing comprehensive guidelines and techniques for industry and government groups to make sure they consider the range of issues in AI ethics and safety in their work.

An excellent example is the Public Policy Programme at The Alan Turing Institute under the direction of Dr. David Leslie. Their work complements and supplements the Data Ethics Framework, which is a practical tool for use in any project initiation phase. Data Ethics and AI Ethics regularly overlap. The Public Policy Programme describes AI Ethics as “a set of values, principles, and techniques that employ

widely accepted standards of right and wrong to guide moral conduct in the development and use of AI technologies. These values, principles, and techniques are intended both to motivate morally acceptable practices and to prescribe the basic duties and obligations necessary to produce ethical, fair, and safe AI applications. The field of AI ethics has largely emerged as a response to the range of individual and societal harms that the misuse, abuse, poor design, or negative unintended consequences of AI systems may cause.” They cite the following as some of the most consequential potential harms:

- Bias and Discrimination
- Denial of Individual Autonomy, Recourse, and Rights
- Non-transparent, Unexplainable, or Unjustifiable Outcomes
- Invasions of Privacy
- Isolation and Disintegration of Social Connection
- Unreliable, Unsafe, or Poor-Quality Outcomes

The Ethical Platform for the Responsible Delivery of an AI Project, strives to enable the “ethical design and deployment of AI systems using a multidisciplinary team effort. It demands the active cooperation of all team members both in maintaining a deeply ingrained culture of responsibility and in executing a governance architecture that adopts ethically sound practices at every point in the innovation and implementation lifecycle.” The goal is to “unite an in-built culture of responsible innovation with a governance architecture that brings the values and principles of ethical, fair, and safe AI to life.” Useful references:

- 1 Leslie, D. (2019). Understanding artificial intelligence ethics and safety: A guide for the responsible design and implementation of AI systems in the public sector. [The Alan Turing Institute](#).
- 2 [Data Ethics Framework](#) (2018).

Principled Artificial Intelligence

In January, 2020, the Berkman Klein Center released a [report](#) by Jessica Fjeld and Adam Nagy “Mapping Consensus in Ethical and Rights-Based Approaches to Principles

for AI”, which summarizes contents of 36 documents on AI principles. This work acknowledges the surge in frameworks based on ethical and human rights to guide the development and use of AI technologies. The authors focus on understanding ethics efforts in terms of eight key thematic trends:

- Privacy
- Accountability
- Safety and security
- Transparency and explainability
- Fairness and non-discrimination
- Human control of technology
- Professional responsibility
- Promotion of human values

They report “our analysis examined the forty-seven individual principles that make up the themes, detailing notable similarities and differences in interpretation found across the documents. In sharing these observations, it is our hope that policymakers, advocates, scholars, and others working to maximize the benefits and minimize the harms of AI will be better positioned to build on existing efforts and to push the fractured, global conversation on the future of AI toward consensus.”

Human-Centered AI

Prof. Ben Shneiderman’s research emphasizes human autonomy as opposed to the popular notion of autonomous machines. The ideas are now available in the [International Journal of Human–Computer Interaction](#). The abstract is as follows: “Well-designed technologies that offer high levels of human control and high levels of computer automation can increase human performance, leading to wider adoption. The Human-Centered Artificial Intelligence (HCAI) framework clarifies how to (1) design for high levels of human control and high levels of computer automation so as to increase human performance, (2) understand the situations in which full human control or full computer control are necessary, and (3) avoid the dangers of excessive human control or excessive computer control. The methods of HCAI are more likely to produce designs that are Reliable, Safe and Trustworthy (RST). Achieving these goals will dramatically increase human performance, while sup-

porting human self-efficacy, mastery, creativity, and responsibility.”

COVID AI

AI is in the news and in policy discussions regarding COVID-19, both about ways to help fight the pandemic and in terms of ethical issues that policymakers should address. Michael Corkery and David Gelles in the NY Times [article](#) “Robots Welcome to Take Over, as Pandemic Accelerates Automation”, suggest that “social-distancing directives, which are likely to continue in some form after the crisis subsides, could prompt more industries to accelerate their use of automation.” An MIT Technology Review [article](#) by Genevieve Bell, “We need mass surveillance to fight COVID-19—but it doesn’t have to be creepy” looks at the pros and cons of AI technology and if we now have the chance to “reinvent the way we collect and share personal data while protecting individual privacy.”

Public Health and Privacy Issues

Liza Lin and Timothy W. Martin in “[How Coronavirus Is Eroding Privacy](#)” write about how technology is being developed to track and monitor individuals for slowing the pandemic, but that this “raises concerns about government overreach.”

Here is an excerpt from that WSJ article: “Governments worldwide are using digital surveillance technologies to track the spread of the coronavirus pandemic, raising concerns about the erosion of privacy. ”

“Many Asian governments are tracking people through their cellphones to identify those suspected of being infected with COVID-19 without prior consent. European countries are tracking citizens’ movements via telecommunications data that they claim conceals individuals’ identities; American officials are drawing cellphone location data from mobile advertising firms to monitor crowds, but not individuals. The biggest privacy debate concerns involuntary use of smartphones and other digital data to identify everyone with whom the infected had recent contact, then testing and quarantining at-risk individuals to halt the further spread of the disease. Public health officials say surveillance will be necessary in the months ahead, as quarantines are relaxed

and the virus remains a threat while a vaccine is developed.”

“In South Korea, investigators scan smartphone data to find within 10 minutes people who might have caught the coronavirus from someone they met. Israel has tapped its Shin Bet intelligence unit, usually focused on terrorism, to track down potential Coronavirus patients through telecom data. One U.K. police force uses drones to monitor public areas, shaming residents who go out for a stroll.”

“The COVID-19 pandemic is ushering in a new era of digital surveillance and rewiring the world’s sensibilities about data privacy. Governments are imposing new digital surveillance tools to track and monitor individuals. Many citizens have welcomed tracking technology intended to bolster defenses against the novel coronavirus. Yet some privacy advocates are wary, concerned that governments might not be inclined to unwind such practices after the health emergency has passed.”

“Authorities in Asia, where the virus first emerged, have led the way. Many governments didn’t seek [permission](#) from individuals before tracking their cellphones to identify suspected coronavirus patients. South Korea, China and Taiwan, after initial outbreaks, chalked up early successes in flattening infection curves to their use of tracking programs.”

“In Europe and the U.S., where privacy laws and expectations are more stringent, governments and companies are taking different approaches. European nations [monitor](#) citizen movement by tapping telecommunications data that they say conceals individuals’ identities.”

“American officials are drawing [cellphone location data](#) from mobile advertising firms to track the presence of crowds—but not individuals. Apple and Google recently [announced plans](#) to launch a voluntary app that health officials can use to reverse-engineer sickened patients’ recent whereabouts—provided they agree to provide such information.”

NSF Program on Fairness in Artificial Intelligence (FAI) in Collaboration with Amazon

A new National Science Foundation solicitation [NSF 20-566](#) has been announced by the Directorate for Computer and Information Science and Engineering, Division of Information and Intelligent Systems, Directorate for Social, Behavioral and Economic Sciences, and Division of Behavioral and Cognitive Sciences.

Please join our discussions at the [SIGAI Policy Blog](#).



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AI Fun Matters

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DOI: [10.1145/3430581.3430588](https://doi.org/10.1145/3430581.3430588)

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Across: 1) Popular team sport. 7) Ancient art gallery. 10) Pathway over the sea. 11) Skin lotion ingredient. 13) Fish similar to sardines. 15) Written by hand. 17) Ripped apart. 18) Painkiller effect. 20) A word just like before. 21) Chapter in history. 22) Rotula's joint. 23) Way to represent a complex number. 24) Crisis with no hope. 26) Army camps. 27) Cash flows received. 29) Improve an algorithm to handle larger problems. 32) Enjoys a fun conversation. 36) Crosswords building block. 37) Brad ____, American actor. 38) Set on fire. 39) Composition for an organ. 40) Mutual understanding. 41) Spell-checker target. 42) Wayne ____, retired English footballer. 44) Top pencil accessory. 46) Not much done at a barbeque. 47) Position along a career pathway. 48) Gracious feathered swimmer. 49) Cattle thieves.

Down: 1) Skipped meals. 2) Majestic musical compositions. 3) Scrabble piece. 4) Play in a casino. 5) Toxic metalloid. 6) Memory failure. 7) Reason to reject. 8) Trojan hero,

Aphrodite's son. 9) _____. Game, science fiction book and film. 12) Jeans brand. 14) Word with greater significance. 16) Great North American lake. 19) Cardio exercise. 22) Citizen ____, American drama film. 23) A time in history. 25) Stack on a desk. 26) Made to follow a curve. 29) Passes as a horror scenario. 30) Small Renault model. 31) Magnificent lights in the sky. 33) President's palace in Paris. 34) Good to harvest. 35) Nature's furious outbreaks. 37) Funding provider. 40) Ratio keyword. 41) Qualified for a basketball competition. 43) Not a number in computer science. 45) Post-mortem decay.

Previous solution: PLANNING - SLAV - TOO - OBOE - ASTERS - LENSES - SEAL - TODD - SRI - MAC - GELS - TOGO - ASHTRAY - MORON - HOLMDEL - SINEW - PENDANT - EDEN - HUMS - LAO - ALE - PASO - SKIN - REDEEM - NEPALI - LENA - AIL - HEEL - LEARNING

Acknowledgment: I thank Karen McKenna for her feedback. The grid is created with the AI system Combust ([Botea, 2007](#)).

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Adi Botea is an AI senior specialist at Eaton, Ireland. He holds a PhD from the Univ. of Alberta, Canada. Adi co-authored over 80 scientific papers. He has published crosswords in Romanian, in national-level venues, for almost 3 decades.