

July 23-29, 2022 Messe Wien, Vienna, Austria

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# **WELCOME TO IJCAI-ECAI 2022**

Welcome to IJCAI-ECAI 2022, the 31st International Joint Conference on Artificial Intelligence and the 25th European Conference on Artificial Intelligence

The International Joint Conference on AI (IJCAI) is the premier international gathering of researchers in AI, and it is the longest running major conference series spanning all areas of Artificial Intelligence (AI), having been launched in Washington, D.C. in 1969. This year the conference is jointly organized with the European Conference on AI (ECAI), which celebrates its 25th edition.

We are very excited that this year's conference will be in-person, the first time since the outbreak of the pandemic. The benefits of an in-person conference cannot be overstated as they allow direct, unmitigated, interaction between researchers and provide opportunities for networking which are crucial for scientists, particularly for those who are at the early stages of their careers. At the same time, not everyone in our community is able to travel to Austria and attend in person. Therefore, all participants will have access via the online Whova app to pre-recorded video presentations of all papers in the main program and will be able to interact with each other.

The IJCAI-ECAI 2022 conference includes numerous activities. This year's keynote speakers are Sumit Gulwani, Jérôme Lang, Tim Miller, Ana Paiva, Turing award winner Judea Pearl, Mihaela Van der Schaar, Gerhard Widmer, and Pete Wurman. They will talk about topics ranging from causality, explainable AI, health, social choice and engineering sociality to AI-assisted programming, the best Gran Turismo racer

and human-machine piano co-performances. There are 4 panels on topics such as AI made in Europe, highly refereed conferences, digital humanism and AI for good. The main track features 681 papers that have carefully been selected from 4537 full paper submissions (an acceptance rate of 15%). The Journal track has 26 presentations summarizing work that has been published in the Artificial Intelligence Journal and the Journal of Artificial Intelligence Research, but has not yet been presented at a major AI conference, while the Survey track features 38 papers (selected from 209 submissions) that provide overviews of AI research areas and topics. There are 26 award-winning papers from sister AI conferences, celebrating excellence in the whole field of AI, 18 demonstrations of AI (selected from 69 submissions) that showcase AI techniques, and 12 talks that will be presented by distinguished early career researchers presenting some of the latest cutting edge research in Al. Furthermore, the IJCAI Doctoral Consortium offers a forum for 26 PhD students to present and discuss their work, obtaining feedback from senior researchers in the field. The IJCAI-ECAI program also includes a robot exhibition track, a diversity and inclusion program, a video competition and 9 challenges and competitions, in which AI teams compete for the best results in areas ranging from game playing (Mahjong, Angry Birds, Automatic Negotiation, Geometry Friends, Neural MMO and Al Olympics) to challenges in machine learning and data science related to ocean ecosystems and noisy labeling.

This year's conference has two special tracks. The novel multi-year "Al for good" track focuses on the United Nations' Sustainable

Development Goals. This track has 33 contributions (selected from 171 submissions) of which two are projects that invite the AI community to contribute to a specific SDG-related challenge. The results will be reported in the next IJCAIs. "The AI, the Arts and Creativity" track is a fitting theme for Vienna, a beautiful city of arts. This track features 17 AI contributions (selected from 77 submissions) that can play a role in the production of creative results.

The IJCAI Awards section features this year's Computer and Thought Award lecture by Bo Li, the John McCarthy Award lecture by Michael Littmann, and the Research Excellence Award lecture by Stuart Russell.

IJCAI-ECAI 2022 includes 32 workshops, which cover a wide range of contemporary topics in AI, and 27 tutorials that will make the latest results in AI accessible to a broader audience. As in recent years, also this edition of IJCAI has co-located events such as ECAI's 11th Prestigious Applications of AI conference (PAIS), the 15th International Symposium on Combinatorial Search (SoCS 2022), and the 2022 World Computer Chess Championships.

The IJCAI-ECAI 2022 Opening Reception will be held on Monday (July 25) evening in the spectacular Library & Learning Center of Vienna University of Economics and Business, designed by the Iraqi-British architect Zaha Hadid. Just before the reception, the first keynote talk – given by Gerhard Widmer - will take place in this building including a live demonstration of human-machine piano co-performance. The Mensa of the same university will welcome our students on Wednesday (July 27) for the IJCAI-ECAI 2022 Student Reception. The Conference Banquet will be held on

Wednesday (July 27) evening at the famous Schönbrunn Palace in the Orangery, one of the two largest baroque orangeries in the world. A classical music concert played by local artists on period musical instruments will complement the perfect Imperial Vienna experience.

Vienna is the federal capital and largest city of Austria with a population of about 1.9 million, and its cultural, economic, and political center. It is the 7th-largest city by population within city limits in the European Union. Until the beginning of the 20th century, it was the largest German-speaking city in the world, and before the splitting of the Austro-Hungarian Empire in World War I, the city had 2 million inhabitants. Today, it has the second largest number of German speakers after Berlin. Vienna is host to many major international organizations, including the United Nations and OPEC. The city is located in the eastern part of Austria and is close to the borders of the Czech Republic, Slovakia, and Hungary. In 2001, the city center was designated a UNE-SCO World Heritage Site. Vienna impresses with its excellent infrastructure, short distances, reliable standards, high service quality and an outstanding range of art and culture. The city combines tradition and modernity - historical flair in a smart city that is constantly evolving. Consequently, Vienna has been repeatedly named most liveable city in the world by Mercer's comparative international study.

Welcome to Vienna! We deeply hope that you will enjoy IJCAI-ECAI 2022 and keep it in good memory.

Rina Dechter, Luc De Raedt, Carles Sierra, Magdalena Ortiz, Stefan Woltran

# COVID-19 PREVENTION MEASURES

We want to make this event as safe as possible for all participants. Many of us are fortunate to live in communities with high vaccine availability and sufficient immunity to significantly reduce the risk of severe outcomes, and our countries are lifting the pandemic restrictions. It is finally possible to have a true in-person event again, where we can talk to each other face to face, exchanging ideas also over a cup of coffee. This in-person interaction is fundamental to the scientific community at large, and particularly critical to younger researchers, whose scientific careers have been severely obstructed by the pandemic so far. However, we are fully aware that the pandemic is not over. A few countries still impose quarantine on entry. For many people, whether there are official restrictions or not, COVID remains a threat. Importantly, not all members of the community can afford the same amount of risk to themselves and those around them.

Hence, to make this event as safe as possible, we have the following measures in place:

- We require vaccination to attend the conference, as stated in the mandatory **COVID disclaimer.**
- These requirements are additional to and independent of the **entry regulations of the Austrian government**. The validity of the vaccines is set based on the Austrian official quidelines (as updated in April, 2022).
- We are implementing all recommended mitigation measures for large indoor gatherings, including ventilation and sanitisation of the facilities.
- FFP2 masks will be required for all indoor scientific events at the convention center.

There is a COVID testing centre at the entrance to the venue (see map on page 33).

FFP2 masks can be purchased quite cheaply in Austrian supermarkets. There is a small reserve of masks at the registration desk.

Please visit <a href="https://ijcai-22.org/covid/">https://ijcai-22.org/covid/</a> for up-to-date information

### VIRTUAL TRACK

IJCAI-ECAI 2022 has a virtual component that operates through the Whova app and is available to all registered participants:

- it provides access to all pre-recorded video's for the presentations in the main tracks of IJCAI, AI for Good, AI – Arts & Creativity, Survey, Demo, Journal, Early Career and Sister Best Paper track;
- there are neither online poster sessions nor online presentations; you can watch the videos of

interest at your convenience;

- the papers are not presented in the in-person conference are clustered into thematic topics; for each topic, there is a suggested meeting time to discuss the papers and interact with the authors;
- Whova provides for each thematic topic also a Q&A forum, where authors and participants can interact via messages, and new thematic topics and meetings can be created by participants.

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**Magdalena Ortiz** TU Wien Austria



**Stefan Woltran** TU Wien Austria

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**Gerald Steinbauer-Wagner** Graz University of Technology, Austria

### Industry Day

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### Advisory

**Thomas Eiter** TU Wien, Austria

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**Toby Walsh** (School of CSE, UNSW Sidney & CSIRO Data 61)

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### Journal Track

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#### Demo Track

Sriraam Natarajan (U. Texas Dallas, USA) Balaraman Ravindran (IITM, India)

#### Video Competition

Ana Paiva (Lisbon, Portugal) Fredrik Heintz (Linköping U., Sweden)

### Sister and Best Papers

Tommie Meyer (U. Cape Town, South-Africa) Fabio Cozman (U. Sao Paulo, Brazil)

### Survey Track

Peter Flach (U. Bristol, UK) José Hernandez-Orallo (U. Valencia, Spain)

### Doctoral Consortium

Tias Guns (KU Leuven, Belgium) Nina Narodytska (Samsung, USA)

### Competitions & Challenges

Michael Thielscher (UNSW, Australia) Dengji Zhao (Shanghai Tech, China)

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#### Workflow Chairs

Jessa Bekker & Vincent Derkinderen (KU Leuven, Belgium) Siegfried Nijssen (UCL, Belgium)

# Special Track on AI, the Arts and Creativity

Ramon Lopez de Mantaras (CSIC, Spain) Hannu Toivonen (U. Helsinki, Finland) Gerhard Widmer (JKU Linz, Austria)

### Special Track on AI for Good

Amir Banifatemi
(Bayspring, USA)
Raja Chatila
(Sorbonne, France)
Virginia Dignum
(Umeå University, Sweden)
Francesca Rossi
(IBM Research, USA)

### Track on Prestigious Applications in Al

Andrea Passerini (Università degli Studi di Trento, Italy) Thomas Schiex (INRAE, France)

### Reproducibility Chairs

Johannes Fürnkranz (JKU Linz, Austria) Pierre Marquis (CRIL-CNRS/Université d'Artois, France)

### Robot Exhibition Chairs

Mehul Bhatt (Örebro University, Sweden) Esra Erdem (Sabanci University, Turkey)

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IJCAI Executive Director, 2020-IJCAI Executive Secretary, 2006 -

### Vesna Sabljakovic-Fritz

Vienna University of Technology (TU Wien)

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#### Francisco Cruz-Mencía

IJCAI and Brainful Labs SL

In co-charge of Registration and Proceedings, 2015-

### Marc Pujol-González

Interficie Internet Services and ConfDNA

### Chief Designer, 2011-

**Marta Abad** Agitació Gràfica

Legal Counsel, 2020-

### Klaus Pfeiffer

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Mihaela Rozman

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### **DIAMOND SPONSORS**

- Artificial Intelligence Journal (AIJ)
- Shanghai Artificial Intelligence Industry Association (SAIA)

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■ TU Wien

# IJCAI-ECAI 2022 SOCIAL EVENTS

# Opening reception

Monday, July 25th, 2022 at 19:00 (Invited Talk starts at 18:00)

Free for all registrants to the Main Conference



Library and Learning Center

The IJCAI-22 Opening Reception will commence at 19:00 at Library and Learning Center (LC), Vienna University of Economics (WU), an impressive work of the iconic British-Iraqi architect Zaha Hadid.

The opening reception will feature entertainment as well as food and drinks.

Preceding the opening reception, Gerhard Widmer will give his keynote talk on "AI & Music: On the Role of AI in Studying a Human Art Form". This talk will take place at 18:00 at Festsaal 1 of the Library and Learning Center (LC).

There will be limited seating capacity at Festsaal 1, but the talk will be streamed live to the aula of the building, where all guests can follow the presentation.

# Conference banquet + concert

Wednesday, July 27th, 2022 at 19:00 (arrival 18:00-19:00)

Included with REGULAR REGISTRATION for the Main Conference

The IJCAI-22 Conference Banquet will take place at the Schönbrunn Orangerie and will include a classical music concert played by local artists from 19:00-19:45. The banquet will start at 19:45. Guests are asked to arrive either before 19:00 or at 19:45 - there will be no entry to the venue during the concert.



Schönbrunn Orangerie



Helmut Kühnelt

### Concert: Ensemble Klingekunst

In this concert, the Ensemble Klingekunst opens up new worlds of sound and plays music by Maria Theresa's favourite composer Georg Christoph Wagenseil, as well as by one of the most successful and prolific composers of the Baroque: Georg Philipp Telemann. The four musicians play on original instruments or their replicas and make the music sound as it did in those days.

Ensemble Klingekunst was founded in 2009 and stands for expressive and passionate musicmaking. The ensemble's focus involves well-grounded historical performance practice, but their main passion is the lively conveyance of music. Not only do they newly discover valuable rarities and combine them with renowned masterworks, but also create new and exciting backdrops, such as performances featuring a Baroque crime story.

# KLINGEKUNST

Sieglinde Größinger – flauto traverso Dimitris Karakantas – baroque violin Christoph Urbanetz – viola da gamba Maja Mijatović – harpsichord www.klingekunst.at

# Student reception

Wednesday, July 27th, 2022 at 20:00

Included with STUDENT REGISTRATION for the Main Conference

The IJCAI-22 Student Reception will commence at 20:00 at the mensa of Vienna University of Economics (WU). Fun, food and drinks await all students attending the conference. For directions to the specific locations of the social events, see the local map in the map section.

# Diversity and inclusion lunch

Monday July 25th, 2022 at 12:30. Brasserie, MESSE WIEN

#### **U\$ 12 for IJCAI ATTENDEES**

The lunch will bring together the broad women community, including junior and senior faculty, researchers, students, and postdocs, and will provide an excellent opportunity to discuss how to grow a diverse and inclusive community in AI, and share success stories and best practices. There will be informal discussion at each table on individual experiences and sharing of information with others. It will take place in the restaurant Brasserie in the main conference venue.

### Sponsored by Elsevier

### **AWARDS**

The awards will be given during the Opening Ceremony on <u>Tuesday</u>, <u>July 26</u>, 8:45-9:45, Strauss 2-3.

### **IJCAI 2022 AWARDS**

The IJCAI-22 Award for Research Excellence, the John McCarthy Award and the Computers and Thought Award are awarded by the IJCAI Board of Trustees, upon recommendation by the IJCAI-22 Awards Selection Committee, which consists this year of:

- Thomas Eiter, Vienna University of Technology, Austria
- Maria Gini, University of Minnesota Twin Cities, USA (Chair)
- James Kwok , Hong Kong University of Science and Technology, Hong Kong, China
- Luc De Raedt, KU Leuven, Belgium
- Dan Roth. University of Pennsylvania, USA
- Chengqi Zhang, University of Technology Sydney, Australia

The IJCAI Awards Selection Committee receives advice from members of the IJCAI-22 Awards Review Committee, who comment on the accuracy of the nomination material and provide additional information about the nominees. The IJCAI-22 Awards Review Committee is the union of the former Trustees of IJCAI, the IJCAI-22 Advisory Committee, the Program Chairs of the last three IJCAI conferences, and the past recipients of the IJCAI Award for Research Excellence and the IJCAI Distinguished Service Award, with nominees excluded.

# IJCAI-22 Award for Research Excellence

July 29th, 15:45-16:30 Strauss 2-3

The Research Excellence award is given to a scientist who has carried out a program of research of consistently high quality throughout an entire career yielding several substantial results. Past recipients of this honor are the most illustrious group of scientists from the field of Artificial Intelligence.

The winner of the 2022 Award for Research Excellence is **Stuart Russell**, Professor of Computer Science and

Smith-Zadeh Professor in Engineering, University of California, Berkeley and Honorary Fellow, Wadham College, Oxford. Professor Russell is recognized for his fundamental contributions to the development of Bayesian logic to unify logic and probability, the theory of bounded rationality and optimization, and learning and inference strategies for operations in uncertain environments.

# IJCAI-22 Computers and Thought Award:

July 29, 13:45-15:15 Strauss 2-3

The Computers and Thought Award is presented at IJCAI conferences to outstanding young scientists in artificial intelligence. The award was established with royalties received from the book, Computers and Thought, edited by Edward Feigenbaum and Julian Feldman. It is currently supported by income from IJCAI funds.

The winner of the 2022 IJCAI Computers and Thought Award is **Bo Li**, Assistant Professor in the Computer Science Department, University of Illinois at Urbana-Champaign. Professor Li is recognized for her contributions to uncovering the underlying connections among robustness, privacy, and generalization in AI, showing how different models are vulnerable to malicious attacks, and how to eliminate these vulnerabilities using mathematical tools that provide robustness guarantees for learning models and privacy protection.

# IJCAI-22 John McCarthy Award:

July 29, 13:45-15:15 Strauss 2-3

The IJCAI John McCarthy Award is intended to recognize established mid-career researchers, typically between fifteen to twenty-five years after obtaining their PhD, that have built up a major track record of research excellence in artificial intelligence. Nominees of the award will have made significant contributions to the research agenda in their area and will have a first-rate profile of influential research results.

The award is named for John McCarthy (1927-2011), who is widely recognized as one of the founders of the field of artificial intelligence. As well as giving the discipline its name, McCarthy made fundamental contributions of lasting importance to computer science in general and artificial intelligence in particular, including time-sharing operating systems, the LISP programming languages, knowledge

representation, common-sense reasoning, and the logicist paradigm in artificial intelligence.

The award was established with the full support and encouragement of the McCarthy family.

The winner of the 2022 John McCarthy Award is **Michael L. Littman**, Professor of Computer Science at Brown University. Professor Littman is recognized for his fundamental contributions to reinforcement learning and Al planning by enabling them to handle partial observability, and formalized state abstractions, building the theoretical foundations for future work.

# Donald E. Walker Distinguished Service Award

The IJCAI Distinguished Service Award was established in 1979 by the IJCAI Trustees to honor senior scientists in AI for contributions and service to the field during their careers.

At IJCAI-22, the Donald E. Walker Distinguished Service Award will be given to **Bernhard Nebel**, Albert-Ludwigs-Universität Freiburg, Germany, retired as of 2022. Professor Nebel is recognized for his substantial contributions, as well as his extensive service to the IJCAI Organization and the entire field of Artificial Intelligence throughout his career.

# **Other IJCAI Awards**

The winners of the following awards will be announced at the Opening Ceremony:

**Distinguished Papers** 

Distinguished Senior Program Committee Members Distinguished Program Committee Members

# **AIJ Awards**

The Artificial Intelligence Journal recognizes papers that are exceptional in their significance and impact. The AIJ Prominent Paper Award is given to a paper published not more than 7 years ago, and the AIJ Classic Paper Award to a paper published at least 15 calendar years ago.

### 2022 Classic Paper Award:

An optimal coarse-grained arc consistency algorithm Christian Bessière, Jean-Charles Régin, Roland H.C. Yap, Yuanlin Zhang

Artificial Intelligence, Volume 165, Issue 2, July 2005, Pages 165-185

### 2022 Prominent Paper Award:

Optimal social choice functions: A utilitarian view Craig Boutilier, Ioannis Caragiannis, Simi Haber, Tyler Lu, Ariel D. Procaccia, and Or Sheffet Artificial Intelligence, Volume 227, October 2015, Pages 190-213 the Austrian Society for Artificial Intelligence (ASAI), the Software Competence Center Hagenberg (SCCH), the publishers Elsevier, Cambridge University Press and IOS Press, the EU Network of Excellence TAILOR, and the upcoming IJCAI-23 conference. Further booths will be devoted to robots and demonstrations.

# **EurAl Distinguished Service Award**

The EurAl Distinguished Service Award is presented every two years to an individual who has made exceptional contributions to the Al community in Europe.

### 2022 EurAl Distinguished Service Award: Luc Steels

Luc Steels is one of the pioneers of AI in Europe. He has played a very significant and sustained role in the organisation of the European AI landscape. In particular, he was one of the co-founders of ECCAI (today EurAI) as well as founding editor, together with Prof. Bob Wielinga, of AI Communications, the premier European AI journal. He has done groundbreaking contributions to a variety of AI topics, including knowledge representation, language, robotics and artificial life.

### **EurAl Artificial Intelligence Dissertation Award**

The 2021 Artificial Intelligence Dissertation Award is sponsored by EurAl, the European Association of Artificial Intelligence. This award includes a certificate signed by the EurAl President and a prize of €1500.

Presentation of the winning dissertation: Wednesday July 27th, 10:00-10:50
Strauss 2-3

Advanced Tools and Methods for Treewidth-Based Problem Solving

Markus Hecher, TU Wien.

### **EXHIBITION**

July 26th - 29th Exhibition Hall B

The IJCAI-ECAI 2022 Exhibits Program at IJCAI-ECAI 2022 will provide companies and academic institutions an opportunity to make visible their position in the field, and provide conference participants with examples of the current uses, needs and opportunities for Artificial Intelligence.

Exhibitors include Huawei, Shanghai Artificial Intelligence Industry Association (SAIA), the Frazer-Nash Foundation,

# **INDUSTRY DAY**

Wednesday July 27th Schubert 3

The IJCAI-ECAI 2022 Industry Day is a unique networking event where entrepreneurs and scientists can discuss the future of AI and its impact on industry and society.

Speakers will include those from companies who a few years ago did not exist but are now giants in industry. They will discuss the Al technologies they use and the key role these technologies play in their company operations and strategy.

Other speakers come from smaller AI start-ups, who will share their experiences with commercializing AI technologies, the problems they have had to overcome, and the elements of success and failure.

These international speakers represent a diverse array of companies and industries, from delivery robots to transportation, retail, multi-media, learning and social apps.

IJCAI-ECAI 2022 Industry Day will also host the ACM SIGAI Industry Award ceremony. This award is given annually to individuals or teams who created AI applications in recent years in ways that demonstrate the power of AI techniques.

IJCAI-ECAI 2022 Industry Day will provide a fascinating insight into what it takes to transition AI from the research lab into the real world and how AI technologies will affect our future society.

# **CONFERENCE AT A GLANCE**

Time	Saturday July 23	Sunday July 24	Monday July 25	Tuesday July 26	Wednesday July 27	Thursday July 28	Friday July 29																
08:45																							
09:00				Opening																			
09:30	WORKSHOPS	WORKSHOPS	WORKSHOPS		Keynote	Keynote	Keynote																
09:45	& TUTORIALS Session	& TUTORIALS Session	& TUTORIALS Session																				
10:00	30331011	30331011	30331011	Keynote	Session	Session	Session																
10:30																							
10:45	Coffee	Coffee	Coffee	Coffee+ Posters	Coffee+ Posters	Coffee+ Posters	Coffee+ Posters																
11:15	Session	Session	Session	Session	Session	Session	Session																
12:30	Lunch Break	Lunch Break	Lunch Break	Lunch Break	Lunch Break	Lunch Break	Lunch Break																
13:45							IJCAI Awards																
14:00	Session	Session	Session	Keynote	Keynote	Keynote	Plenary																
15:00	Coffee	Coffee	Coffee	Coffee+	Coffee+	Coffee+																	
15:15	Conee	Conee	Conee	Posters	Posters	Posters	Coffee																
15:30																							
15:45																							IJCAI Awards
16:00					Session		Session	Plenary															
16:30	Session	Session	Session		Session		Closing																
16:45							Closing																
17:00				Poster		Poster																	
18:00			Keynote	Session		Session																	
19:00																							
20:00					Banquet (arrival 18:00)																		
21:00			Opening Reception	Opening Reception	Opening Reception	Opening Reception	Opening Reception		Student Reception (starts 20:00)														
22:00					(300, 63 20.00)																		
23:00																							

## **CO-LOCATED EVENTS**

# 15th International Symposium on Combinatorial Search (SoCS 2022)

Heuristic search and other forms of combinatorial search optimization

are a very active areas of research in artificial intelligence, robotics, planning and other areas of computer science. SoCS is meant to bring researchers in such areas together to exchange their ideas and cross-fertilize the field. SoCS targets researchers and submissions in all fields that use combinatorial search, including artificial intelligence, planning, robotics, constraint programming, meta-reasoning, operations research, navigation and bioinformatics. We especially invite submissions presenting real-world applications of heuristic search.

Website: https://sites.google.com/unibs.it/socs2022 Location: Freihaus building of TU Wien, room FH6 (2nd floor), Wiedner Hauptstraße 8, 1040 Vienna Dates: 21-23 July

# Edge Artificial Intelligence for Industrial Applications (EAI4IA)

EAI4IA aims to bring together researchers and practitioners working on providing edge artificial intelligence methods, techniques and tools to be used in industrial applications. EAI4IA comprises technical presentations, keynotes and panel discussions focusing on industrial-edge AI hardware, software and AI frameworks.

Website: https://ai4di.automotive.oth-aw.de/dissemination-2/conference/ei4ai

Location: TU Wien, Lecture Hall El 10, Gußhausstraße 27-29. 1040 Vienna

Dates: 25-26 July

# Austrian Society for Artificial Intelligence (ASAI) IJCAI Satellite Event 2022

This event aims to bring together AI researchers from Austria and to connect the Austrian AI community under the umbrella of the Austrian Society for Artificial Intelligence, who is organizing this event.

Website: https://www.semsys.aau.at/events/asai-ijcai-2022/ Location: Vienna University of Economics and Business, TC 1.01,

25 July 2022, 15:00-18:00, 25 July 2022, 15:00-18:00

# 11th International Conference on Prestigious Applications of Intelligent Systems (PAIS 2022)

PAIS is a conference which highlights all aspects of the application of intelligent systems. Its aim is to provide a forum for academic and industrial researchers and practitioners to share experience and insight on the applicability, development and deployment of intelligent systems. PAIS is the largest showcase of real applications using AI technology worldwide and is the ideal place to meet developers of successful applications.

Website: https://ijcai-22.org/pais-program/

Location: Schubert 1

#### **Chess Events**

Creating a super-human chess-playing program was one of the early "grand challenge" problems of AI research. In the 1940s, 1950s, and 1960s, early pioneers of AI -- including Claude Shannon, Alan Turing, Herb Simon, Allen Newell, and John McCarthy -- laid the foundations for success. Chess programs started playing in human tournaments in the late 1960s, and the first computer chess tournament was in 1970. The first World Computer Chess Championship (WCCC) was held in Stockholm in 1974. The third one was in Linz, Austria in 1980. In those early days of AI, the programs' playing abilities were modest at best.

In 2022 the World Championship returns to Austria. Now the chess programs are super-human. Whereas the human World Chess Champion, Magnus Carlsen, boasts a rating of 2864 (June 2022), the top chess programs are closing on 3500 -- an enormous gap between man and machine.

At IJCAI, three will be three world championships:

- \* The World Computer Chess Championship (WCCC) -- participants can use any hardware (and some may use hundreds of processors/cores/CPUs). Each program has 1:45 hours plus 15 seconds per move to complete a game.
- \* The World Software Chess Championship (WSCC) -- participants all run on the same hardware, allowing for an assessment of the software's ability. Each program has 1:45 hours plus 15 seconds per move to complete a game.
- \* The World Computer Chess Speed Championship (WCCSC) -- participants can use any hardware. Each program has 5 minutes plus 5 seconds per move to complete their game.

Website: https://icga.org/?page\_id=121

Room: Congress Lounge

Dates:

July 23: participants meeting
July 24-28: competition
July 29: playoff (if needed)

### Al Lounge with Stuart Russell

July 28th

This lounge will be an outreach event, organized by the VCLA (http://www.vcla.at) and the CAIML (https://www.tuwien.at/caiml/) of TU Vienna, and is planned to take place on Thursday, July 28, 2022, in the late afternoon, at a location in the city center of Vienna. Research Excellence Award winner Stuart Russell will discuss his new book "Human Compatible".

# **Diversity and Inclusion Events**

Free of charge for those with 2-day Workshop Registration

# IJCAI 22 Seminar on Al Diversity and Inclusion for Africa (AIDIA)

July 25 (Monday), morning (9:00am-12:30pm),

Room Schubert 3

Website: https://aim.um6p.ma/en/news

### Diversity and inclusion lunch

Monday July 25th, 2022 at 12:30. Brasserie, MESSE WIEN

Sponsored by Elsevier

### **Build NLP in Africa**

July 25 (Monday), afternoon (14:00pm-17:30pm),

Room Schubert 3

Website: https://www.masakhane.io/events/social-ij-

cai-2022

# Towards Diversity, Equity, and Inclusion (DEI) in AI Research

July 23 (Saturday), afternoon (14:00pm-17:30pm),

Room Galerie 9-10

Website: https://www.womeninai.co/wailabs

#### **Inclusive STEM Education**

July 23 (Saturday), morning (9:00am-12:30pm), Room Gal-

erie 17-18

Website: https://divstem.l3s.uni-hannover.de/

The 2nd AI for Cognitive and Physical Frailty Seminar

July 24 (Sunday), morning (9am-12:30pm),

Room Galerie 3-4

Website: http://ijcai-aif-2022.org/

# Artificial Intelligence – Diversity, Belonging, Equity, and Inclusion (AIDBEI)

July 23 (Saturday), afternoon (14:00pm-17:30pm),

Room Galerie 17-18

Website: https://kdd.cs.ksu.edu/Workshops/IJCAI-AID-

BEI-2022/

# Free things not to miss

27 Tutorials

4 Panels

Industry Day

Opening Keynote with a live demonstration

of human-machine piano co-performance

Opening reception

Banquet or Student Reception

Exhibition program

Robot demonstrations

Competitions

Al Lounge

# **INVITED SPEAKERS**

# AI & MUSIC: ON THE ROLE OF AI STUDYING A HUMAN ART FORM



**Gerhard Widmer** JKU Linz, Austria

Monday 18.00 h
Festsaal 1, Library and Learning
Center (LC), Vienna University of
Economics (WU)
Limited Seating capacity / streaming
to aula of building
Subsequent to the talk, the opening
reception will take place in the same
building

### ARE THE INMATES STILL RUNNING THE ASYLUM? EXPLAINABLE AI IS DEAD, LONG LIVE EXPLAINABLE AI!



**Tim Miller**University of Melbourne, Australia

Tuesday 9.45 Messe Wien, Strauss 2-3

TRAINING THE WORLD'S BEST GRAN TURISMO RACER



**Pete Wurman** Sony Al America, USA

<u>Tuesday 14.00</u> Messe Wien, Strauss 2-3

### FROM AI TO SOCIAL CHOICE



**Jérôme Lang** CNRS, Université Paris-Dauphine PSL, France (sponsored by EurAl)

Wednesday 9.00 Messe Wien, Strauss 2-3

### AI-ASSISTED PROGRAMMING



**Sumit Gulwani** Microsoft Research

Wednesday 14.00 Messe Wien, Strauss 2-3

# WHAT IS CAUSAL INFERENCE AND WHERE IS DATA SCIENCE GOING?



**Judea Pearl** UCLA, USA

Thursday 9.00 Messe Wien, Strauss 2-3

# PANNING FOR INSIGHTS IN MEDICINE AND BEYOND: NEW FRONTIERS IN MACHINE LEARNING INTERPRETABILITY



**Mihaela van der Schaar** University of Cambridge, UK

Thursday 14.00 Messe Wien, Strauss 2-3

# ENGINEERING SOCIALITY AND COLLABORATION IN AI SYSTEMS



**Ana Paiva**University of Lisbon, Portugal

<u>Friday 9.00</u> Messe Wien, Strauss 2-3

# GENERAL TUTORIAL AND WORKSHOP TIMETABLE

Please see the website for the precise schedules of each workshop and tutorials, which may divert from this general schedule.

Tutorials' timetable						
8:30-9:00	Registration					
9:00-10:45	morning tutorial/workshop, part 1					
10:45-11:15	Coffee break					
11:15-12:30	morning tutorial/workshop, part 2					
12:30-14:00	Lunch break*					
14:00-15:00	afternoon tutorial/workshop, part 1					
15:00-15:30	Coffee break					
15:30-17:30	afternoon tutorial/workshop, part 2					

<sup>\*</sup> Lunch is not provided.

# **TUTORIAL PROGRAM**

			23rd	d Jul			24tl	h Jul			25tl	h Jul		
ID	Tutorial	AM 1	AM 2	PM 1	PM 2	AM 1		PM 1	PM 2	AM 1	AM 2	PM 1	PM 2	Room
T01	A Tutorial on Domain Generalization			·				Ċ		·		·	_	Virtual
T02	Pure Exploration in Multi-Armed Bandits													Lehar 4
Т03	Distortion in Social Choice & Beyond													Lehar 4
T04	Adversarial Sequential Decision-Making													Lehar 2
Т06	Deep Learning Methods for Query Auto Completion													Schubert 3
T07	Constraints in Fair Division													Lehar 4
Т08	Tensor Computation for Data Processing													Stolz 1
T09	Spoken Language Understanding													Lehar 1
T10	Science communication for Al researchers													Lehar 3
T11	Opinion Formation in Social Networks													Strauss 1
T13	Recent Advances in Retrieval- Augmented Text Generation													Virtual
T14	Automated Synthesis													Stolz 2
T15	Deep Energy-Based Learning													Strauss 1
T16	When Multiple Agents Care About More than One Objective													Lehar 3
T17	Mechanism Design without Money: Matching, Facility Locations, and Beyond													Stolz 1
T18	Disentangled Representation Learning													Stolz 2
T19	Graph Neural Networks													Strauss 1
T20	Hybrid Probabilistic Inference with Algebraic and Logical Constraints													Schubert 3
T21	Tableau methods for linear-time temporal logics													Schubert 6
T22	Automated Verification of Multi-Agent Systems													Strauss 1
T23	Evidential Reasoning and Learning													Lehar 1
T24	Robust Time Series Analysis													Lehar 4
T25	Using constraint solvers as an oracle, with CPMpy													Schubert 3
T26	Designing Agents' Preferences, Beliefs, and Identities													Lehar 1
T27	Representing learning for acting and planning													Lehar 4
T28	Conversational Recommender Systems													Lehar 1
T29	Decision Focussed Learning													Lehar 1

# **WORKSHOP PROGRAM**

		23r	d Jul	24t	h Jul	25t	h Jul	
ID	Workshop/Event Title	AM	PM	AM	PM	AM	PM	Room
W01	Workshop on Trustworthy Federated Learning							Lehar 1
W03	13th Multidisciplinary Workshop on Advances in Preference Handling (M-PREF22)							Galerie 15-16
W04	The Fourth Workshop on Financial Technology and Natural Language Processing (FinNLP-2022)							Galerie 17-18
W05	AlofAl 2022: 2nd Workshop on Adverse Impacts and Collateral Effects of Al Technologies							Galerie 7-8
W06	Workshop on Agents and Robots for reliable Engineered Autonomy (AREA)							Galerie 9-10
W08	Ad Hoc Teamwork							Galerie 19-20
W09	The 2nd International Workshop on Heuristic Search in Industry (HSI)							Schubert 6
W10	What can FCA do for Artificial Intelligence? (Tenth Workshop Edition)							Galerie 19-20
W11	First International Workshop on Spatio-Temporal Reasoning and Learning							Galerie 11-12
W14	12th International Workshop on Agents in Traffic and Transportation (ATT 2022)							Schubert 5
W17	Cognitive Aspects of Knowledge Representation							Schubert 1
W18	Workshop on Artificial Intelligence Safety (AlSafety)							Stolz 1
W19	35th International Workshop on Qualitative Reasoning							Galerie 11-12
W20	MRC 2022 - 13th International Workshop on Modelling and Reasoning in Context							Galerie 1-2
W21	Explainable AI (XAI) Workshop @ IJCAI-22							Lehar 2
W22	The 13th International Workshop on Agent-based Complex Automated Negotiations							Galerie 15-16
W25	Third International Workshop on Human Brain and Artificial Intelligence (HBAI 2022)							Schubert 4
W26	NASO 2022 - "workshop on New Architectures for Search and Optimization							Galerie 13-14
W27	Evaluation Beyond Metrics							Schubert 1
W28	Safe RL Workshop							Stolz 2

		23rc	d Jul	24t	h Jul	25t	h Jul	
ID	Workshop/Event Title	AM	PM	AM	PM	AM	PM	Room
W31	Scarce Data in Artificial Intelligence for Healthcare (SDAIH)							Schubert 2
W32	Communication in Human-Al Interactions							Schubert 2
W36	Process Management in the AI era (PMAI)							Galerie 13-14
W39	CDCEO 2022 - Workshop on Complex Data Challenges in Earth Observation							Schubert 2
W41	Semantic Techniques for Narrative-based Understanding							Galerie 5-6
W43	Workshop on Generalization in Planning							Schubert 4
W44	Artificial Intelligence for Time Series Analysis: Theory, Algorithms, and Applications							Schubert 4
W45	Workshop on the Interactions between Analogical Reasoning and Machine Learning							Galerie 5-6
W48	IJCAI 2022 AI4AD Workshop: Artificial Intelligence for Autonomous Driving							Lehar 3
W49	Fourth Workshop on Bridging the Gap Between AI Planning and Reinforcement Learning (PRL)							Lehar 2
W50	The fifth Data Science Meets Optimization (DSO) Workshop Proposal							Schubert 5
W51	Workshop on Al for understanding the Ocean and Climate Change							Galerie 7-8
PAIS	Prestigious Applications of Intelligent Systems 2022							Schubert 1
DC	<u>Doctoral Consortium</u>							Schubert 6
Al4G	IJCAI for good special track - Project Forum							Lehar 3
DI	Diversity and Inclussion Events							Galerie rooms and Schubert 3

# **ROBOTICS SHOWCASES & DEMOS**

### Tuesday to Friday, Exhibition Hall B

Robot and Demo presentations are located at the IJCAI-22 booth in Hall B at the Exhibition Center. The presentation schedule is as follows:

### Schedule

	Event		July	27th	July	28th	July	29th	July
ID			4PM- 7PM	9AM- 4PM	4PM- 6PM	9AM- 4PM	4PM- 7PM	9AM- 4PM	Х
DMX	Demos (see below)								
R01	Demonstration of state-of- the-art Social Intelligence on PAL Robotics' ARI and TIAGo platforms (PAL Robotics)								
R02	Frida: A Narrative Robot Artist with Versatile Styles (CMU)								
R03	The Tilburg Dexterous Hand: A Low Cost Research Platform for Everyone (Tilburg University)								
R04	Sasha - Please Tidy Up (TU Wien)								

# Demo

The demonstration track provides a platform for exchanging ideas between theory and practice, but also for showcasing innovative applications of AI techniques to real-world problems. The demonstration track continues to attract a lot of interest and this year we accepted 18 out of a total of 69 submissions. Some of the exciting demonstrations are, in no particular order, a benchmark for adversarial robustness, a tool for explaining text classifiers, a news event analysis tool-kit, a pill dispensing system for personalized medicine, a virtual machine scheduling algorithm, a system for multi-format human preference feedback, a sign language avatar, and a mobile app to help people with dementia. Please check the conference program for the complete list of demonstrations and the detailed schedule.

### **VIDEO COMPETITION**

July 29, 10:00 - 10:45, Schubert 1

# 1. What is tokenization and how does it work? Tokenizers explained

Letitia Parcalabescu (Heidelberg University, Department of Computational Linguistics)

### 2. How TikTok's Algorithms Figure You Out

Jenny Zhang Zhuoting (Institute for Infocomm, A\*STAR); Duan Jiafei (Institute for Infocomm, A\*STAR); Samson Yu (Institute of High Performance Computing, A\*STAR)

# 3. Food Digital Twins using advanced AI techniques towards addressing SDG #2

Parijat Deshpande (Tata Consultancy Services)

# 4. HyperDemocracy: Large-scale Consensus Support Platform based on Social Multiagent Systems

Takayuki Ito (Kyoto Unviersity); Rafik Hadfi (Kyoto University); Jawad Haqbeen (Kyoto University); Sofia Sahab (Kyoto University)

# 5. GENEREIT: Generating Multi-talented Reinforcement Learning Agents

Aristotelis Lazaridis (Aristotle University of Thessaloniki, School of Informatics); Christos Perchanidis (Aristotle University of Thessaloniki, School of Informatics); Ioannis Vlahavas (Aristotle University of Thessaloniki, School of Informatics)

### COMPETITION

#### Schedule

	15 6 333		n Jul	27t	h Jul	28t	h Jul	29th Jul	
ID	Competition	AM	PM	AM	PM	AM	PM	AM	Room
CC3	Automated Negotiating Agents Competition								Schubert 1
CC5	Geometry Friends Cooperative Game Al Competition								Schubert 1
CC6	The Neural MMO Challenge								Schubert 1
CC8	Angry Birds Al Competition								Schubert 1
	Joint Competitions Session								Schubert 3

### List of competitions

CC1: Al methods for determining ocean ecosystems from space: Combining genomic information, microscopic and satellite imagery

https://oceania.inria.cl/#ai-ocean-challenge-2022

CC2: Mahjong AI Competition

https://botzone.org.cn/static/gamecontest2022a.html

CC3: Automated Negotiating Agents Competition (ANAC) https://web.tuat.ac.jp/~katfuji/ANAC2022/index.html

CC4: 1st Learning and Mining with Noisy Labels Challenge http://competition.noisylabels.com/

CC5: Geometry Friends Cooperative Game AI Competition https://gaips.inesc-id.pt/geometryfriends/

CC6: The Neural MMO Challenge

https://www.aicrowd.com/challenges/ijcai-2022-the-neural-mmo-challenge

CC7: Al Olympics Competition http://www.jidiai.cn/ijcai\_2022/

CC8: AIBIRDS 2022 – Angry Birds AI Competition http://aibirds.org/

### **DOCTORAL CONSORTIUM**

July 25, 08:45 Schubert 6

### **Doctoral Consortium Co-chairs**

Tias Guns (KU Leuven, Belgium) Nina Narodytska (Samsung, USA)

The doctoral consortium provides an opportunity for Ph.D. students to discuss their research interests and career objectives with established researchers in AI, network with other participants, and receive mentoring about career planning and career options. The doctoral consortium will expose students to different areas of research within AI and help build professional connections within the international community of AI researchers.

## **PANELS**

### PANEL: DIGITAL HUMANISM - OUR RELATIONSHIP TO TECHNOLOGY

July 26, 11:15-12:30

Strauss 2-3

Digital Humanism is an interdisciplinary approach, integrating humanities, social, and technical sciences, that aims to describe, to analyze and, above all, to influence the complex interplay between IT and humanity – for a society that respects human rights. So it's not just about AI and its social implications, but has a much broader view on our relationship to technology, e.g., monopolies in the Web, national sovereignty, privacy, or work in a new world. This breadth - in terms of problem areas, audiences, and disciplines involved - also presents a significant challenge. In the discussion, after introducing the concept (see Vienna Manifesto on Digital Humanism) and discussing its various dimensions, we will discuss these specific challenges.

Moderator: Hannes Werthner, TU Wien (Austria)

- Virginia Dignum, Umea University (Sweden)
- Gerti Kappel, TU Wien (Austria), dean of the faculty of Informatics
- Peter Knees. TU Wien (Austria) and expert in recommender systems and music retrieval
- Sabine Köszegi. TU Wien (Austria), Member of the EU high level group on Al
- Carles Sierra, Al Research Institute (Spain) and Presi-
- Toby Walsh (School of CSE, UNSW Sidney & CSIRO Data 61)

### PANEL: AI MADE IN EUROPE - WHAT IS IT? IS IT IMPORTANT?

July 27, 11:15-12:30 Strauss 2-3

Over the past number of years the European Commission and the EU Member States have promoted the concept of a "European approach to AI". This vision is focused on human-centric and trustworthy AI technology, sometimes described as building an ecosystem of trust for AI. Complementary to this is the objective of ensuring that Europe is a leader in research, development, innovation, and deployment of AI. This is sometimes described as building as "ecosystem of excellence for AI". In this panel we will explore the major themes of the European approach for AI. We will explore what differentiates AI "made in" and "made for" Europe, and whether this is a vision that will place Europe in a position of technological leadership in the world, and what needs to be done to get AI from the minds of brilliant scientists and into products and services that have the potential for massive positive impact on the world.

Chair: Barry O'Sullivan, University College Cork, Ireland

#### Panelists:

- Holger Hoos, RWTH Aachen University, Germany
- Michela Milano, University of Bologna, Italy
- Francesca Rossi, IBM Research, USA
- Michael Wooldridge, University of Oxford, UK

### PANEL: TRUSTWORTHY AI FOR GOOD: CHALLENGES. LESSONS LEARNED, AND SYNERGIES

27 July, 15:30-16:30

Strauss 2-3

Al for Good aims to apply Al technologies to social good problems, such as those related to the UN SDGs. Trustworthy Al is about developing and using Al to ensure properties, such as fairness, transparency, explainability, and robustness. The ideal scenario is to employ trustworthy AI approaches to AI solutions to social good problems. With this vision in mind, this panel wants to explore the challenges and lessons learnt in both fields. It also aims to discuss the possible synergies between the concrete initiatives and socio-technical approaches identified and adopted to build trust in AI or to use it for social good purposes.

In this discussion, we plan to address issues of multidisciplinarity, scaling and sustainability of the business model, collaborative platforms, multi-disciplinary and multi-stakeholder research and development environments, education, and culture change.

Moderator: Francesca Rossi, University of Padua (Italy)

#### Panelists:

- Virginia Dignum: Umea University (Sweden)
- Carles Sierra, Al Research Institute (Spain) and President EurAl
- Milind Tambe, Gordon McKay Professor of Computer Science and Director CRCS Center for Research on Computation and Society, Harvard School of Engineering (USA)

### PANEL: HIGHLY REFEREED AI CONFERENCES

July 28, 11:15-12:30

Strauss 2-3

Due to a rapidly increasing number of submissions, running the paper selection process at large AI conferences has become more and more challenging, and the results may not be fully satisfactory to multiple parties. This panel is devoted to discussing issues around this: how to cope with thousands of submissions, and how to warrant quality of reviews? How does this increase in numbers affect the relative role of conferences and journals, especially in connection with funding and academic promotion? Are recent methods of desk-rejecting papers a good solution? Are journal first publication models a good alternative method?

Moderator: Carles Sierra: Al Research Institute (Spain) and President EurAl

### Panelists:

- Luc De Raedt: KU Leuven (Belgium) and Örebro University (Sweden)
- Maria Gini: College of Science & Engineering Distinguished Professor, University of Minnesota College of Science and Engineering (USA)
- Peter Stone: University Distinguished Teaching Professor at the University of Texas, Austin (USA) and Executive Director of Sony Al America
- Christian Bessiere: Researcher at the University of Montpellier, LIRMM (France)

# SPECIAL TRACKS

### Special Track on AI, the Arts and Creativity

Sessions: Thursday July 28

Lehar 1

There is a growing interest in developing artificial intelligence techniques that can have a role in the production of creative results. Research in this field has already produced AI systems that can generate creative artifacts or behavior in fields such as music, visual arts, storytelling, games, architecture, design and scientific discovery, either autonomously

or in collaboration with humans. The aim of this IJCAI-ECAI 2022 special track is to explore the relationships between AI and the arts, creativity and creative practice.

https://ijcai-22.org/special-track-on-ai-the-arts-and-creativ-ity-accepted-papers/

#### Special Track on AI for Good

Sessions: Tuesday-Thursday July 26-July 28 Stolz 2

Artificial intelligence is by now pervasive in our life and is increasingly having an impact on how we live, work, and function as individuals and as a society. It is therefore very important to make sure that it is built and used in a responsible and beneficial way, so that we can exploit it to get to the future we collectively envision. The United Nations' Sustainable Development Goals (SDGs) (see https://sdgs.un.org/ goals) provide a vision of the future that can be the north star of trajectories for technological and societal progress. The AI for Good track is intended to explore how AI can contribute to achieve progress on the 17 SDGs, by sharing the current state of research and practice, explore directions for future work, and create opportunities for collaboration. Besides the technical sessions and the panel during the main program, the track also features a project forum on Monday, July 25.

https://ijcai-22.org/special-track-on-ai-for-good-accepted-papers/

### Early Career Spotlight Track

Early career researchers discuss some of the latest and most innovative work currently done in Al.

Session 1 July 26 15:30-17:00 Strauss 2-3

Session 2 July 28 15:30-17:00 Strauss 2-3

- Irrational, but Adaptive and Goal Oriented: Humans Interacting with Autonomous Agents. *Amos Azaria*
- Interaction and Expressivity in Collective Decision-Making. *Umberto Grandi*
- Analyzing and Designing Strategic Environments in Social Domains. *Hau Chan*
- Mechanism Design Powered by Social Interactions: A Call to Arms. *Dengii Zhao*
- Towards Reliable and Inclusive Natural Language Processing. *Kai-Wei Chang*
- Controllable Text Generation for Open-Domain Creativity and Fairness. Nanyun (Violet) Peng
- Counting, Sampling, and Synthesis: The Quest for Scalability. *Kuldeep S. Meel*

- Graph Representation Learning and Pre-Training. *Yuxiao Dong*
- Integrating Machine Learning and Optimization to Boost Decision Making. Ferdinando Fioretto
- Towards Theoretically Grounded Evolutionary Learning. Chao Qian
- Active Learning: Selection Criteria and Query Types. Sheng-Jun Huang
- Machine-Assisted Teaching for Open-Ended Problem Solving. *Adish Singla*

### Best Papers in Sister Conference Track

Presentations are integrated to the main program according to the topics (those papers are marked with acronyms starting with "SI")

This track celebrates excellence in the field by featuring presentations of award-winning papers from AI-related conferences. As the applicability of AI is ever growing, this track can potentially foster interdisciplinary collaborations. The track will run throughout the whole technical program.

https://ijcai-22.org/best-papers-from-sister-conferences-accepted-papers/

### JOURNAL TRACK

The 2022 IJCAI journal track includes 23 papers that have appeared in AIJ or JAIR over the previous two years.

Presentations are integrated to the main program according to the topics (those papers are marked with acronyms starting with "JT")

The journal track invites authors to present their research papers published in top AI journals and have never been presented at a large AI conferences such as IJCAI or AAAI.

The authors of such papers are given an opportunity to present their work during the conference and publish an extended abstract of this work in the conference proceedings.

This track provides both a very useful service to the community who are interested in keeping up with the literature in the top Al journals as well as an opportunity for the authors of such papers, who will have a platform to present their results to a broad Al audience and receive feedback in a highly interactive manner. To achieve these goals, authors are instructed to make the extended abstract as well as the presentation as accessible as possible to a general Al audience.

https://ijcai-22.org/journal-track-accepted-papers/

### **SURVEY TRACK**

Presentations are integrated into the main program according to the topics (those papers are marked with acronyms starting with "SV")

The IJCAI-ECAI 2022 Survey Track enables the AI community to learn from AI researchers who are experts on a topic by providing them with the opportunity to give a talk presenting a synthetic survey of that topic.

https://ijcai-22.org/survey-track-accepted-papers/

### **CLOSING EVENT**

July 29th 2022, 16:30-17:00 Strauss 2-3

Please join us for our closing ceremony! This will be your opportunity to thank the members of the local arrangements committee whose hard work made the conference possible. There will also be a preview of the next IJ-CAI-ECAI that will be held in Cape Town, South Africa, in August 2023. Also not be be missed will be a raffle for a load of books donated by publishers. After this there will be food and drinks!

# IJCAI-ECAI-22 SPECIAL MEETINGS

IJCAI Board of Trustees Meetings (*Business Suite 3*) Sunday, from 09:00 to 18:00 Monday, from 09:00 to 12:45

IJCAI Executive Committee Meeting (Business Suite 1+2) Monday, from 14:00 to 17:00

EurAl Board Meeting (Business Suite 3) Monday, from 17:30-18:30

AIJ Editorial Board Lunch, (*Business Suite 1+2*) Tuesday, from 12:30 -14:00

International Al Societies Meeting (*Business Suite 1+2*) Tuesday, from 15:30 to 17:00

EurAl General Assembly (Business Suite 1+2) Tuesday, from 17:30 -19:30 EurAl Fellows Lunch Wednesday, from 12:30-14:00 (Business Suite 1+2)

IJCAI Annual Business Meeting Thursday, from 12:45 to 13:30 (regular session room; up to 200 people) OPEN TO PUBLIC

Wrap-Up Meeting (Business Suite 3) Friday, from 10:30 to 11:30

IJCAI-22 and IJCAI-23 LAC Brief Meeting (Business Suite 3) Friday, from 11:30 to 12:30

IJCAI Trustees Wrap-up Lunch (Business Suite 3) Friday, from 12:30 to 14:00

# PARTICIPANT REGISTRATION FOR IJCAI-ECAI 2022

All attendees must pick up their registration packages for admittance to programs. The registration is located on the left side right after passing the round entrance.

### Registration Desk Schedule:

The registration desk is open from 8:00 to 18:00 from Saturday July 23rd to Thursday July 28th, and from 8:00 to 12:00 on Friday, July 29th.

On Monday July 25th the registration desk will remain open until 19:00.

### **TERMS AND CONDITIONS**

### **COVID DISCLAIMER**

I herewith certify that, I am currently in a possession of one of the following certificates in English language with validity OVERLAPPING the dates of the conference (July 23-29, 2022):

- 1. Certificate of full vaccination: 2 doses, the second one dated not earlier than January 30, 2022, or 3 doses, the third one dated not earlier than July 30, 2021. \*Please note that the validity of the booster has been extended to twelve full months\*.
- 2. Certificate of recovery dated NOT earlier than January 30, 2022.
- 3. Certificate of recovery dated earlier than January 30, 2022, plus a certificate of a minimum of two vaccinations, the last one dated after July 30, 2021.

I herewith explicitly authorize the IJCAI Organization and its agents to control such a certificate at time of onsite reg-

istration at the Messe Wien, Orangerie of the Schönbrunn Palace and University of Economics in Vienna, Austria or any other time as required by the Austrian health regulations and Federal Ministry of Health of the Republic of Austria during the IJCAI-ECAI-22 Conference.

By clicking accept, the authorization process will be complete and irrevocable.

### All authors have agreed to the following disclaimer.

I hereby acknowledge that the IJCAI-ECAI-2022 is an in-person event with a virtual component for major sponsors and delegates who cannot travel pursuant to the Covid-19 regulations of their country of residence.

I acknowledge that all Covid-19 measures for travelers to Austria were lifted on March 5, 2022 and there are no obstacles preventing me from entering Austria on part of the Government of the Republic of Austria.

Every paper has to be presented in-person by either one of its authors or a proxy designated by the author(s).

I hereby certify that my paper will be presented in-person by either myself or one of my peers.

I hereby certify that should the Covid-19 regulations of my country of residence prevent me to participate myself, I shall do my very best to find a proxy to present my paper and send the Program Chair the name and affiliation of that person by camera-ready deadline May 2, 2022. I acknowledge that the proxy must register to the conference in their own name.

I acknowledge that failure to find the proxy will result in a very limited exposure of my paper at the conference. In case I do not have a proxy to present my paper, I must inform the Program Chair by the camera-ready deadline.

#### **GENERAL DISCLAIMER**

### Cancellation and Changes

All cancellations must be sent to registration@ijcai.org via e-mail. Any change of name will be dealt with as a cancellation and a new registration. **Students** applying to IJCAI-ECAI-22 Volunteering Program **MUST NOT** register before notification from Volunteers' Chair, otherwise the processing fee of U\$ 100 shall apply.

In case of cancellations until June 20, 2022, payments will be refunded less U\$ 100 processing fee. The processing fee of U\$ 100 shall apply to any and all cancellations!

No refund will be made for cancellations received after June 20, 2022 or to the registrants who fail to attend in person.

In case of conference cancellation for reasons beyond the control of IJCAI-ECAI-22 organizers, the liability of the IJCAI-ECAI-22 organizers is limited to the fees already paid by the registrants. IJCAI-ECAI-22 organizers will not be responsible for any personal inconvenience that may arise.

#### General Disclaimer for service providers:

In offering the Vienna Airport, Airport public transportation system, Viennese public transportation system, the Messe Wien, Austropa Interconvention services and all other service providers (hereinafter referred to as "Supplier(s)") for the IJCAI-ECAI-22, the IJCAI-ECAI-22 organizers act only in the capacity of agent for the Suppliers and have no control over personnel, equipment or operations or providers of accommodations or other services included as part of the IJCAI-ECAI-22 program. The IJCAI-ECAI-22 organizers assume no responsibility for and will not be liable for any personal delay, inconvenience or other damage suffered by conference participants which may arise by reason of (1) any wrongful or negligent acts or omissions on the part of any Supplier or its employees, (2) any defect in or failure of any vehicle, equipment or instrumentality owned, operated or otherwise used by any Supplier, or (3) any wrongful or negligent acts or omissions on the part of any other party not under control, direct or otherwise, of the IJCAI-ECAI-22 organizers.

### Information Processing:

The processing of personal data, such as the name, address, e-mail address, affiliation and payment information of a data subject shall always be in line with the General Data Protection Regulation (GDPR), and in accordance with the country-specific data protection regulations applicable to the IJCAI Organization.

### Photograph and Video Release

For valuable consideration received, I hereby give the International Joint Conferences on Artificial Intelligence Organization (IJCAI) the absolute and irrevocable right and permission, with respect to the photographs and film or tape that it will take of me during the 31st International Joint Conference on Artificial Intelligence and the 25th European Conference on Artificial Intelligence (IJCAI-ECAI-22) held July 23-29, 2022 at the Messe Wien, Messeplatz 1, A-1020 Vienna, Austria

- (1) To copyright the same in its own name or any other name that it may choose.
- (2) To use, re-use, publish, and re-publish the same in whole or in part, individually or in conjunction with other photographs or images or video recordings, in any medium and for any purpose whatsoever, including (but not by way of limitation) illustration, promotion, advertising and trade, and
- (3) To use my name in connection therewith if he/she so chooses.

I hereby release and discharge the Photographer/Cameraman, his/her heirs, executors, assigns and any designee (including any agency, client, broadcaster, periodical or other publication) from any and all claims and demands arising out of or in connection with the use of such photographs, film, or tape, including but not limited to any claims for defamation or invasion or privacy.

I am of legal age and have read the foregoing and fully understand the contents thereof.

### **CONFERENCE APP**

### Whova App for your IJCAI Program

The IJCAI schedule is available on your smartphone (iPhone or Android) via the "Whova" app.

To use this, download and install the Whova app from the App Store (for iPhones) or Google Play (for Android phones). Then Click "Sign Up" in the app using the email address you used at the IJCAI 2022 Registration system. You will then create a password for the mobile app itself. You will be ready to go. Enjoy!

### **INTERNET**

Free wireless internet access is available at the conference sites.

To log in to the complimentary delegate wireless at the Messe Wien Exhibition and Congress Center please follow these steps;

Network: IJCAI2022 Password: Vienna2022

### **SOCIAL MEDIA**

Join the conversation, connect your social media posts using the conference hashtag #IJCAI22 and tagging us at @IJCAlconf.

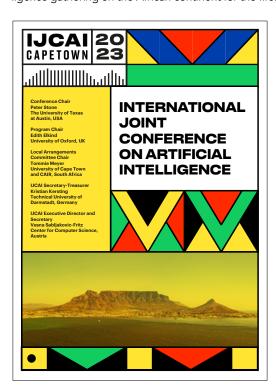
## **IJCAI 2023**

The 32nd International Joint Conference on Artificial Intelligence (IJCAI) will be held in Cape Town, South Africa from 19 to 25 August 2023.

Cape Town is one of the leading cities in Africa, the second-most populated city in South Africa, and the legislative capital of the country. It is an economic powerhouse with a good climate, spectacular natural beauty, a fine academic legacy, and an impressive portfolio of history-makers. The city is set within the unique Cape floral kingdom and is surrounded by the historic winelands of the Western Cape that have earned the city its reputation as a gastronomic destination. Iconic Table Mountain forms the backdrop of the downtown area that runs down to its famous harbour and Table Bay. Add to this natural beauty an interesting cultural diversity and a creative spirit, and you discover why Cape Town is Africa's most popular tourist destination and the #1 Convention City in Africa.

IJCAI 2023 will take place in the Cape Town International Convention Centre (CTICC), the leading international convention centre on the African continent. The CTICC is conveniently located in the central business and entertainment hub of Cape Town.

We look forward to welcoming you to a leading artificial intelligence gathering on the African continent for the first time.



### **CONFERENCE VENUE**

Messe Wien Exhibition and Congress Center

Address:

Hall B, entrance Congress Center,

Messeplatz 1

A-1020 Vienna

Metro stop U2 'Messe Prater'

The Messe Wien Exhibition and Congress Center is one of the most modern exhibition and conference centers. With up to 55.000 square meters of exhibition space, which is directly adjacent to the conference center, it offers flexible solutions for events of all kinds. The underground station right in front of the event location means that Messe Wien is excellently connected to Vienna's public transport network. The city center can be reached by subway in just 10 minutes and the airport in around 30 minutes. Messe Wien Exhibition and Congress Center is centrally located, yet close to Vienna's famous Prater park and around the corner from the campus of the new Vienna University of Economics and Business, the Sigmund Freud Private University and the modern, green "Viertel Zwei" business and residential area.

When you arrive at the Messe Wien Exhibition Center and Congress Center you will need to make your way to the Congress Center part of the complex, Hall B. Once you are on the ground floor of the main entrance of the Congress Center you will see the IJCAI-ECAI 2022 registration desk.

Opening ceremony and invited talks are held in Strauss 2-3 (Congress Center) on the ground floor. To access the room Strauss 2-3, you pass registration, continue through a connecting hall where you see rooms Stolz 1-2 and Lehar 1-4 on your left and proceed through Strauss 1, which has direct access through two doors (left/right). Alternatively, you can access Strauss 2-3 from the mall that connects Congress Center and Exhibition Center. IJCAI exhibitions are allocated in Halle B (Exhibition Center).

Monday workshops, tutorial sessions, and the main conference sessions are in the Congress Center ground floor (Stolz 1-2, Lehar 1-4) and first floor (Schubert 1-6) as well as Halle B Galerie (Galerie 1-20).

*Ground floor:* pass the registration desk and continue straight.

First floor: use stairs (signs for Schubert) next to the registration desk or stairs in the mall that connects Congress Center and Exhibition center.

Halle B Galerie: access first floor of the Congress Center. When entering from the registration, check signs for Schubert 6, pass Schubert 6, turn right, pass an (open) doors, proceed on a connecting bridge to Halle B Galerie.

When entering from the mall that connects Congress Center and Exhibition center, just walk around the staircase and use the connecting bridge to Halle B Galerie.

#### IJCAI-ECAI 2022 OPENING & RECEPTION

Time: Monday July 25th, (Invited Talk 18:00; Reception 19:00) Location: Library & Learning Center of Vienna University of Economics

Just a few minutes walking distance from the conference venue; see map.

### IJCAI-ECAI 2022 DIVERSITY AND INCLUSION LUNCH

<u>Time: Monday July 25th, 12:30</u> Location: Brasserie, Messe Wien

#### IJCAI-ECAI 2022 BANQUET

Time: Wednesday July 27th,19:00 (arrival 18:00-19:00)

No entry during concert 19:00-19:45 Location: Orangery of Schönbrunn Palace

Address: Schönbrunner Schloßstraße 47, 1130 Vienna To be reached via Subway U4 (station name: Schönbrunn) or Tram lines 10 and 58 (station name: Schönbrunn Schlossallee)

### IJCAI-ECAI 2022 STUDENT RECEPTION

Time: Wednesday July 27th, 20:00

Location: Mensa of Vienna University of Economics Just a few minutes walking distance from the conference venue; see map.

# **HOW TO GET TO IJCAI 2022**

### From Vienna International Airport (VIE) (approx. 40 min)

From Vienna International Airport to the venue take the line S7 in the direction of "Laa an der Thaya" or "Wolkersdorf" to "Praterstern". At Praterstern get on U2 in the direction of "Seestadt" and get off at the stop "Messe Prater".

### From Vienna Central Station (approx. 20 min)

From Vienna Central Station to the venue take the line U1 in the direction of "Leopoldau" to "Praterstern". At Praterstern get on U2 in the direction of "Seestadt" and get off at the stop "Messe Prater".

See the local maps in the map section.

Current update – U2 partly closed due to underground network extension

- From End of Mai 2021 until Fall 2023 the U2 only operates between stations Schottentor and Seestadt.
- Direct replacement along the Ring Boulevard are the tram lines D, 1, 2 and 71.
- An additional tram line is operating as U2/ (between Schottenring and Karlsplatz)
- The U1 has increased intervals during peak hours.

### **RESTAURANTS**

Please note lunches will not be provided within the program.

There are plenty of cafes and restaurants in walking distance from the venue with great options for lunches, including vegetarian and/or vegan plates. Right next to Messe is the new campus of the Vienna University of Economics and Business (WU), which offers a wide variety of pleasant restaurants with daily lunch menus for around 10 euros, outdoor seating, and take-away service. There is a student cafeteria (Mensa), and several little pleasant cafes with a cozy atmosphere. Around the campus there are also bakeries and supermarkets.

Here is list of some hand-picked restaurants close to the venue.

**Baschly:** restaurant in the WU campus with middle-eastern street food.

https://baschly.com/home/baschly-1020/

Finn: restaurant in the WU campus with Asian food.

https://finn.wien/

**Das Campus:** restaurant and bar in the WU campus with a vintage industrial atmosphere.

https://www.dascampus.at/

**Das Glashaus:** restaurant in the WU campus offering Mediterranean and Austrian dishes.

https://www.dasglashaus.at/

**L'Osteria:** Italian restaurant in the WU campus. https://losteria.net/en/restaurants/restaurant/

wien-wirtschaftsuni/

**Mensa WU:** student cafeteria https://www.wumensa.at/

Library Cafe and Roastery WU: cafe in the WU campus

with nice options for lunch. https://www.library-cafe.at/

**Le Cedre:** Lebanese restaurant just opposite of the venue.

https://www.restaurant-lecedre.at/

**Zur Grünen Hütte:** restaurant with Austrian cuisine and good lunch options, just a few steps from the venue. https://www.zurgruenenhuette.com/

**Mochi Ramen Bar:** japanese restaurant offering ramen dishes not far from the venue.

https://www.mochi-ramen.com/

**Burger's Bar:** typical burger restaurant close to Messe. https://burgersbar.at/

The Green Prater, one of Vienna's largest and most beautiful public parks, often regarded as one of the best city parks of the world, is located just a few minutes walking distance from the conference venue and offers a broad variety of culinary opportunities. There are numerous restaurants with beautiful large gardens, providing an excellent dining option during the hot summer days. Beware, some of the restaurants are typically very crowded and tables should be reserved in advance. Here we list a few popular restaurants in Prater.

**NENI am Prater:** popular middle-eastern restaurant with a rooftop terrace offering an amazing view of Prater and the city skyline, just 5 minutes walk form the venue <a href="https://neni.at/restaurants/prater/">https://neni.at/restaurants/prater/</a>

**Die Allee:** restaurant with a pleasant terrace near to the main allee of Prater.

https://neni.at/restaurants/prater/

**Schweizerhaus:** classical Viennese restaurant with a large beer garden, famous for its "Stelze" (pork knuckle) and its Budweiser beer.

https://schweizerhaus.at/

**Kolarik Luftburg:** restaurant with a nice garden offering traditional and organic Viennese cuisine. https://kolarik.at/en/luftburg/

### Kosher restaurants in Vienna

There are many kosher restaurants, supermarkets, and bakeries in the second district, around the U2 Subway station Taborstrasse, only NN minutes from the Messe-Prater Station. Restaurants in this area include the following.

**Mea Sharim kosher restaurant** offers European, middle eastern, and Asian dishes.

https://www.mea-shearim.at/en/

**Bahur Tov kosher restaurant** offers regional, oriental, Jewish, and international dishes. https://bahur-tov.com/ **Shefa Kosher Supermarket and Restaurant** seems to be a popular supermarket offering a wide variety kosher products and also kosher meals.

https://www.shefa-markt.com/

## **DISCOVERING VIENNA**

Please visit

http://congress.austropa-interconvention.at/ijcai2022 for information about Vienna and Sightseeing tours.

## **OTHER EVENTS**

Music Film Festival at Vienna City Hall Square 2022, <u>July 2 - September 4</u> https://filmfestival-rathausplatz.at/

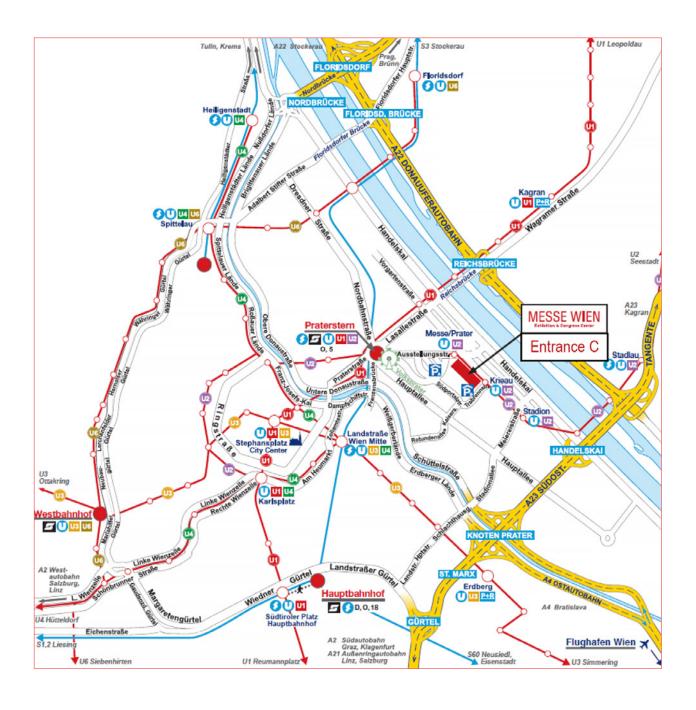
Vienna International Dance Festival "Impulstanz", <u>July 7 - August 7</u> https://www.impulstanz.com/en/

Festival of Austrian Popular Music "Popfest Wien", July 28-July 30 https://popfest.at/

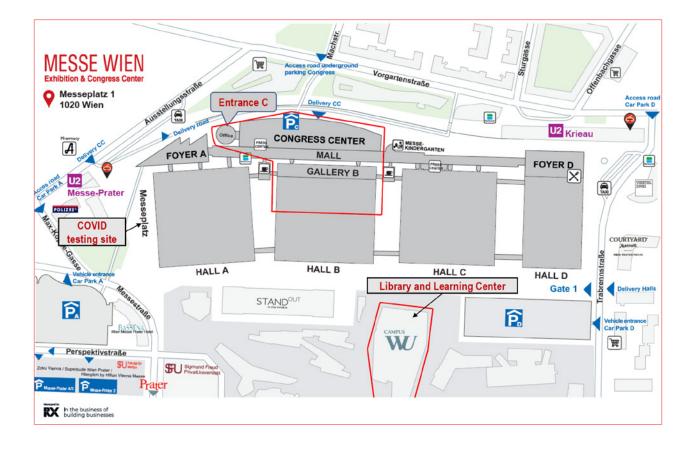
See <a href="https://www.wien.info/en">https://www.wien.info/en</a> for further events in Vienna.

# **GETTING AROUND**

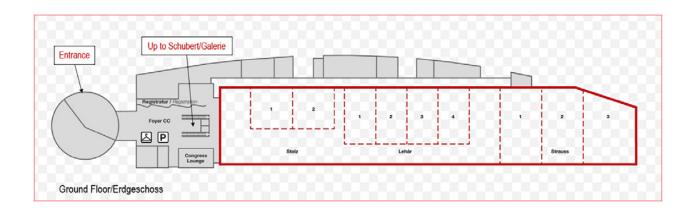
# Getting to the venue



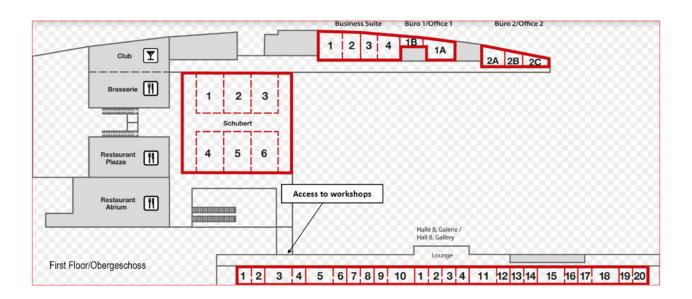
# Venue and surroundings



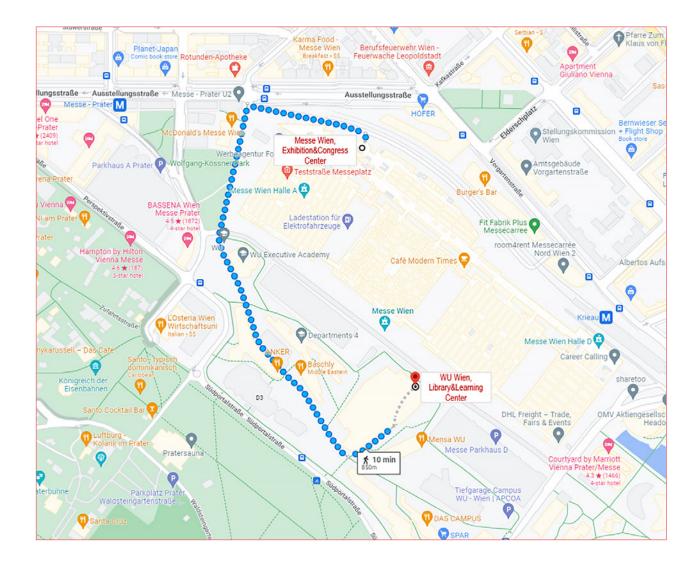
# Venue - ground floor



# Venue - first floor



# Getting to the reception



# Getting to the banquet



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# **CONFERENCE AT A GLANCE**

Time	Saturday July 23	Sunday July 24	Monday July 25	Tuesday July 26	Wednesday July 27	Thursday July 28	Friday July 29
08:45							
09:00	WORKSHOPS & TUTORIALS Session	WORKSHOPS & TUTORIALS Session	WORKSHOPS & TUTORIALS Session	Opening Keynote			
09:30					Keynote	Keynote	Keynote
09:45				Keynote			
10:00					Session	Session	Session
10:30							
10:45	Coffee	Coffee	Coffee	Coffee+ Posters	Coffee+ Posters	Coffee+ Posters	Coffee+ Posters
11:15	Session	Session	Session	Session	Session	Session	Session
12:30	Lunch Break	Lunch Break	Lunch Break	Lunch Break	Lunch Break	Lunch Break	Lunch Break
13:45							- IJCAI Awards
14:00	Session	Session	Session	Keynote	Keynote	Keynote	Plenary
15:00	Coffee	Coffee	Coffee	Coffee+ Posters	Coffee+ Posters	Coffee+ Posters	Coffee
15:15							
15:30	- Session	Session	Session	Session	Session	Session	
15:45							IJCAI Awards Plenary
16:00							
16:30							Closing
16:45							
17:00				Poster Session		Poster Session	
18:00			Keynote				
19:00							
20:00			Opening Reception		Banquet (arrival 18:00) Student Reception (starts 20:00)		
21:00							
22:00							
23:00							

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