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ASIC 2021

ASIC 2021 Twentieth Annual Summer Interdisciplinary
Conference

Grand Hotel Des Alpes
San Martino di Castrozza, Italy
July 14, Wednesday – July 19, Monday, 2021





Above: Views of and from San Martino

The Twentieth Annual Summer Interdisciplinary Conference (ASIC 2021) will be held at Grand Hotel Des Alpes, Via Passo Rolle, 118, 38054 San Martino di Castrozza TN, in the Dolomites of Italy. The conference will have talks every afternoon and evening on the six consecutive days July 14, Wednesday–July 19, Monday, 2021 (the last talks will be held in the evening of July 19, so the departure date should be July 20 or later). These dates were chosen to allow attendees to combine ASIC 2021 with either or both of the Mathematical Psychology Meetings (to be held in July approximately July 21-24 possibly in Europe and possibly virtually) and the Cognitive Science Society Meetings (to be held in Vienna, Austria, July 26-29).

If you have a 5% or higher chance of attending, go to the link on this

website 'Potential Attendees' and list yourself, your probability, and your email. See the hotel website at <https://www.hoteldesalpes.it/en/>. Grand Hotel Des Alpes is highly rated with two highly rated restaurants. It has a conference room that ASIC will use if attendance is not too high (otherwise we plan to use a city conference center 200 meters distant). The breakfasts and dinners will be held in the hotel. The hotel will cater the breaks to start each session at the meeting room site. The hotel should have sufficient rooms (41). If there are too many attendees, the manager has arranged for additional rooms at a nearby hotel with breakfast only; dinner would be held with the group at Hotel Des Alpes. For reservations, descriptions and details, visit the links on this website "LODGING" and "MEALS".



Above: Grand Hotel Des Alpes

San Martino di Castrozza



Aerial View of San Martino

San Martino is in the eastern Dolomites of Italy about two hours by car north of Venice. It is a famous resort town in both winter and summer. In summer it offers a huge range of activities that are mentioned below but outlined in more detail on the link on this website: “Activities”.

The nearest international airports are Venice, about two hours south by car, or Innsbruck, about three hours north by car. It is accessible also by train and bus. Travel options are found on this website on the link ‘TRAVEL’.

Activities

San Martino and the surrounding area offers a huge array of summer activities, including include hiking, scrambling, and peak bagging, via ferrata, mountain and road biking, rock climbing, mountaineering (though most mountaineering would have to take place before or after the conference, given the time required), paragliding, and canyoning. There are also many leisure activities such as sightseeing, fishing, tennis, and golf. For a more complete description visit the link on this website “ACTIVITIES”.



Hiking near San Martino

Richard M. Shiffrin of Indiana University - Bloomington is the organizer:
Email should be directed to (for all contact info, select
'Contact' from this website menu).



ASIC Organizer, Rich Shiffrin, atop Torre Grande, near Cortina. Italy

Conference Subject Matter

The subject matter of the ASIC conferences is interdisciplinary, but with a primary emphasis upon a wide variety of scientific domains within the broad frame of Cognitive Science. ASIC uses the very successful format of

previous ASIC and AIC conferences: Days are free for leisure activities and discussions among participants. The talks are in the later afternoon/early evening, followed by dinner. The date has been chosen to make it convenient for attendees to bring family/friends

Previous Years' Websites

Several parts of this year's website are still under construction. For examples of ASIC websites from 2005 through 2019, most listing speakers, titles and abstracts, visit the link titled: ASIC Websites. The 2020 conference was cancelled due to the pandemic, but it is anticipated that it will be held in the same place (Chamonix) and roughly the same dates in June, but in 2022.



Invitation

The conference is open to all interested parties, and their family and friends. An invitation is NOT needed to attend. It will be of particular interest to scholars who fit the very general theme of the conference. We encourage you to send the conference information and invitation to friends and colleagues.

Due to the small number of spots for speakers, in the event that too many attendees desire to speak, the organizer will adapt the lengths of talks and/or select whom will give talks.

Conference Aims

The conference is truly interdisciplinary and will welcome interesting talks aimed at a general audience on any subject, but most talks have ranged across a variety of subjects in cognitive science, including:

- modeling of cognition
- neuroscience, cognitive neuroscience
- psychology (including perception, psychophysics, attention, information processing, memory and cognition)
- computer science and artificial intelligence
- machine intelligence and learning
- methodology and statistics
- linguistics, psycholinguistics and computational linguistics
- philosophy of mind, cognitive science

We especially invite talks emphasizing theory, mathematical modeling, and computational modeling (including neural networks and artificial intelligence). Nonetheless, we require talks that are comprehensible and interesting to a wide scientific audience. Speakers will provide overviews of current research areas, as well as of their own recent progress.



Conference Format

There is a single speaking session each day (no posters), intentionally organized to maximize the dissimilarity of each day's presentations. If the number of participants exceeds the number of speaking slots (either 42 or 48), then the organizer will select some talks to be of shorter duration, and if necessary choose the speakers who will have the opportunity to present their work. Information on submitting proposals for presentation is on the page of this website labeled "Talk Submissions". Please submit talk information on the website. Your information, such as authors, title, abstract and so on can be deleted, replaced, or altered at any time up to June 15.

The conference will start with registration and a reception with drinks and food from about 15:30 - 16:15 on Wednesday July 14. On subsequent days there will be drinks and light snacks from ~ 15:45 - 16:15, followed by a session of about seven or eight spoken presentations that may include a mid-session break. The last evening of talks will be Monday, July 19, so plan to depart no earlier than Tuesday, July 20

It will not escape the careful reader that this conference format frees most of the day for either discussions with colleagues or various other activities with colleagues, family, and friends. We hope and expect all scientific attendees and participants to attend all sessions. The time frame will allow day trips to nearby sites, but arrange to return in time for the sessions. Travel to sites and planned activities from which a return for the session will not be possible by 16:00 should be arranged for days preceding or following the conference.

Registration


You are not officially on the list for presenting research until you register and send the registration fee. Visit the [Registration page](#) at this website.

Lodging

A block of rooms are presently being held, but are limited (at the price negotiated), and unreserved rooms will gradually be returned to the general public, so reserve soon. For information visit the [Lodging page](#) at this website.

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Registration Information for ASIC 2021

If you have a 5% or greater chance of attending ASIC 2021, please list yourself on the website at the link 'Potential Attendees'. If you reach the point where you are reasonably sure of attending, please fill out the [registration form](#) and submit your registration fee. This fee pays for rental of the conference room, conference equipment rentals, catering costs for snacks and drinks at conference breaks and receptions, and several other miscellaneous costs.

Registration fee schedule, in US dollars:

Payment Date	Price	Guests (age 6 or older)
Prior to Feb. 15, 2021:	\$200	\$120
Feb. 16 – May 15:	\$250	\$150
After May 15:	\$300	\$180

'Guests' are friends and family members not attending the talks, but attending the reception at the start of each session (and partaking of the food and drink).

Persons staying at sites other than Grand Hotel Des Alpes should plan on taking dinner at the conference hotel at a cost of 25 euro per person per dinner. This should be paid directly to the hotel at the time.



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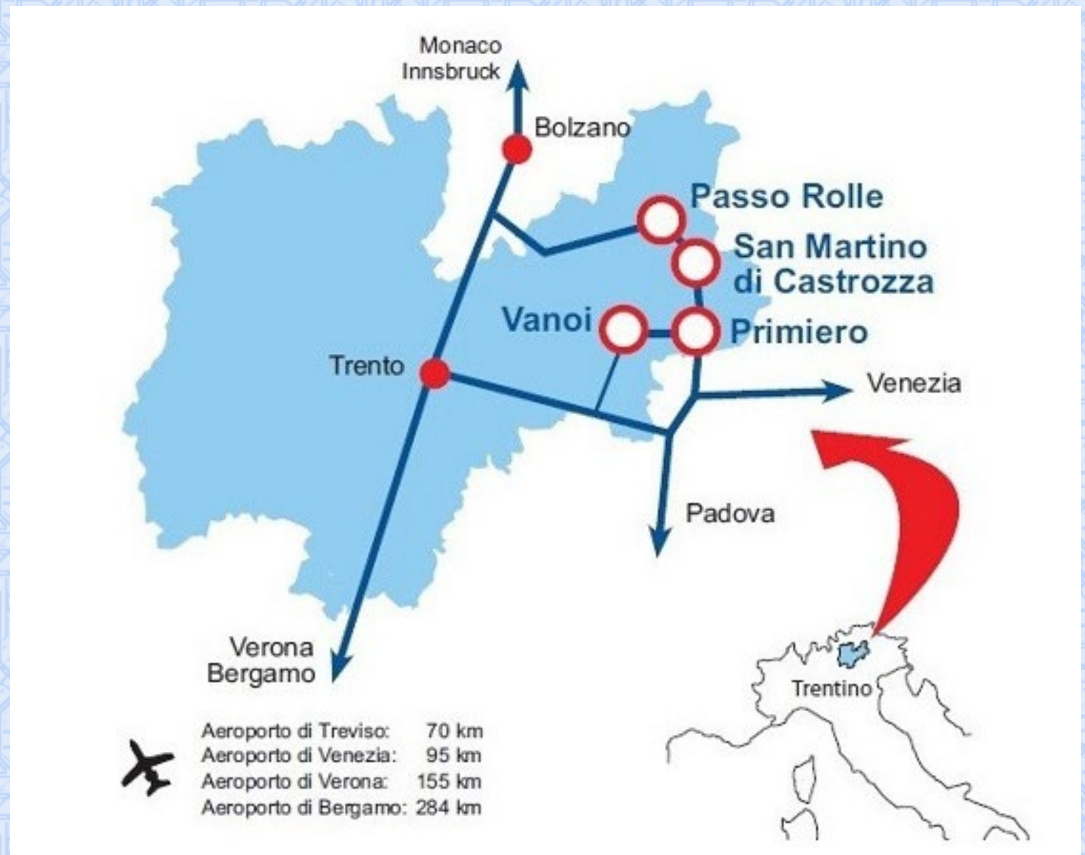
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Travel to Grand Hotel des Alpes, San Martino di Castrozza, Italy



Note: It is a good idea to explore the area near San Martino di Castrozza with Google Maps, and Google Earth.

San Martino is in Trentino in the Alps of Italy, in the heart of the Dolomites UNESCO World Heritage Site.



Detailed descriptions of transportation options are found at:

<https://www.sanmartino.com/EN/getthere/>

Once in Europe/Italy San Martino can be reached by car, by bus, or by train plus a bus ride. The closest international airport is Venice Marco Polo (from which car travel may take a little over two hours) but there are a number of regional airports and a few more distant international airports such as Milan Malpensa and Innsbruck.

If coming from the west/south (Geneva), you will be coming on the other side of N205. Turn right onto Route des Montquarts. Turn right onto Route de vers le Nant. Hotel on the right.

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Lodging



We have placed a hold on rooms for our conference at Grand Hotel Des Alpes in the town of San Martino di Castrozza, in the Dolomites of Italy about two hours north of Venice. This is a highly rated 4* hotel with an excellent restaurant.

The hotel website is found at: <https://www.hoteldesalpes.it/en/>

Via Passo Rolle 118, 38054 San Martino di Castrozza, Primiero San Martino di Castrozza Italy

Telephone: 39 0439 769069

Manager/Proprietier/Owner: Maurizio Rimaldi.

Note: Maurizio does not speak English well, so it might help to have an Italian speaker on the phone with you when you call.



The hotel has a pool, hot tub, high speed wifi, spa, bar/lounge, free parking, business center, and a shuttle bus service.



LODGING RATES

Each attendee makes their own booking reservation, with a credit card that will not be charged (partially) until April 10, and pays their own lodging charges when checking out.

Rates in Euros (half board, includes breakfast and dinner):

- One person in a smaller room:
 - Five such rooms available at 107/day
- One person in a larger room:
 - Seven such rooms available at 122/day
- Additional larger rooms for singles at 140/day
- Two persons in a double: 92/person/day

Family Lodging

There are several options:

- Some doubles are large enough to have or two additional beds added. The price for the first two adults in such a room will remain 92/person/day but additional adults have a discount of 10%. There are discounts for children in the same room: < 12 years, 30%; < 7 years 40%; < 2 years, 60%
- There are four doubles that have a connecting door, and hence can be used for families. If you book such connecting rooms then each person will pay a rate of 92/day, regardless of age.
- There are in San Martino nearby hotels and B&Bs. Attendees

staying elsewhere with breakfast elsewhere can (and probably should) take meals with the group at Grand Hotel Des Alpes at the modest charge per person of 25 euros per meal. If you stay elsewhere and want to take breakfast at the Grand Hotel des Alpes, you can discuss individual breakfast prices with the hotel.

CONFERENCE ROOMS:



The hotel's conference room (above) can hold 50 people or a few more. If this is insufficient for our needs, the conference will use the city conference theater (below) about 300 m distant.



PARKING AND INTERNET:

These are free.

RESERVATIONS:

To obtain the conference rates, email the organizer to obtain the conference code. Reservations can be made by email or telephone (but note that Maurizio Rimondi does not speak English well).

Email: G. HOTEL DES ALPES [REDACTED]

Telephone: 39 0439 769069

BOOKING AND CANCELLATION POLICY:

The hotel will take a credit card number, but not charge the card until the following dates, with the amounts shown.

Free cancellation until May 10th.

10% penalty for cancellation after May 10th

15% penalty for cancellation after June 10th

100% penalty for cancellation after July 4th

(If an emergency causes you to cancel after July 4, you will be able to use your 20% deposit for yourself for a future stay, or for someone else you arrange to take a future stay, so in that case will not lose the entire amount).

May 10 is the free cancellation date, so I will send a reminder on May 4 to every possible attendee listed on the website, in case you decide you need to cancel. Hence you should reserve early if there is any reasonable possibility of attending. That will insure that the hotel keeps enough rooms for ASIC.

SCHEDULE AND MEALS:

Each day the conference will begin with a reception with refreshments and light food near or in the conference room, starting at about 15:30-15:45. The talks will take place from about 16:00 to 20:00. Following the talks attendees will dine together as a group at the hotel (see '[Meals](#)' on this website).

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Meals/Dining/Breaks



A generous buffet breakfast is included in the daily lodging price; breakfast is available from 8 AM to 10 AM, but those wishing an earlier start can arrange that with the hotel the evening before. A dinner with options ordered from the menu will be served in the hotel restaurant when the sessions end. The dinners will include vegetarian and vegan choices (the number of attendees requiring such options will be assessed shortly prior to the conference).

In order to reduce the time needed for dinner, please order your meal the prior night.

The dinner start time will be scheduled to begin shortly after each daily session ends depending on the site used for the talks.

Attendees staying elsewhere may join the main group for dinner at a charge

of 25 euro.

There will be a catered reception with drinks and finger food each day prior to the speaking session, sited near the conference room, whether the one in the hotel, or the city conference room. On the first day, July 14, the reception will begin about 15:15. On the other days the reception will start about 15:45. The registration fee includes payment for these receptions/breaks. Guests and family members not attending the sessions, but planning to attend the receptions, have a reduced registration fee.



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Activities



Hiking in the San Martino area

(This page will be elaborated in the near future)

San Martino is an outstanding outdoor adventure destination in the Dolomites of Italy. This page will highlight a few of the many activities available.

There are two cable cars in the area open in summer, the Colverde-Rosetta (see photo below), and the Tognola. See for details:

<https://www.sanmartino.com/EN/elencoimpiantiEN/>



Hiking:

The area has 145 hiking trails, 27 long distance hiking trails, and 5 thematic trails. There are too many hiking and walking tours to list. For a few examples see:

<https://www.outdooractive.com/en/hikes/san-martino-di-castrozza-primiero-vanoi/hiking-in-san-martino-di-castrozza-primiero-vanoi/2521924/>

There are many rock climbing areas near San Martino that offer the possibility of excursions from which a return would be possible in time for

the conference.

Also see: <https://www.sanmartino.com/EN/hikes/>. This site has descriptions of several types of hikes in the area.



Mountaineering, Scrambling, and Peak Bagging:

There are more than 100 choices, ranging from strenuous hikes to scrambles to technical ascents. For examples see:

<https://www.outdooractive.com/en/mountaineering-tours/san-martino-di-castrozza-primiero-vanoi/mountaineering-in-san-martino-di-castrozza-primiero-vanoi/5441074/>.

Some of these would require technical equipment and/or too much time to undertake during the conference days but could be done prior or after ASIC.

We hope that once again mountain guide and scientist Harald Atmenspacher will be available to lead groups on outings.

Rock Climbing:



There are many rock climbing areas near San Martino that offer the possibility of excursions from which a return would be possible in time for the conference.



As is our usual practice, we will offer one or two group climbing days (at reduced pricing). These are organized at attractive and scenic venues. Tentatively the first day will be July 15, Thursday. These days are aimed at all climbers, but particularly newcomers and novices. The novices are taught how to climb on easy routes with topopes in place. The better climbers come and enjoy climbing on the more challenging routes in the same area. We expect the group days to be guided by Guido Bonvicini and perhaps other local guides.

Via Ferrata

Another favorite activity in which high mountain exposure and scenic views are available without technical climbing skills and with considerable safety: Each participant walks along, up, and down cliffs and canyons attached to and holding on to iron cables affixed to the rock faces. This is often done by families and children, though the more difficult ones might be facilitated by a guide.



Via Ferrata examples

Canyoning

There is excellent canyoning opportunities in Val Noana. See <https://www.sanmartino.com/en/canyoningEN/> for descriptions. Participants don wetsuits and with the help of guides enter and descend a mountain stream in a narrow canyon. This exciting activity requires no experience and is suitable for families and children.



Parasailing (Parapente in France):

This is another exciting activity that can be enjoyed by novices, when done in tandem with an expert guide. One lifts off typically from a hillside or cliff (usually after a cable ride to reach the start), using a parasail large enough to lift and sail both the guide and the client. The two ascend thermals (often following birds) and eventually descend and land in a field. There are several guiding services offering this experience. See:

[https://www.google.com/search?](https://www.google.com/search?client=safari&rls=en&q=parapenting+sam+martino+di+castrozza&ie=UTF-8&oe=UTF-8)

[client=safari&rls=en&q=parapenting+sam+martino+di+castrozza&ie=UTF-8&oe=UTF-8](https://www.google.com/search?client=safari&rls=en&q=parapenting+sam+martino+di+castrozza&ie=UTF-8&oe=UTF-8)



Road Biking and Mountain Biking:

The San Martino area has many opportunities for both forms of biking.
See:

<https://www.outdooractive.com/en/road-bike-rides/san-martino-di-castrozza-primiero-vanoi/road-bike-rides-in-san-martino-di-castrozza-primiero-vanoi/1466873/>

and

<https://www.outdooractive.com/en/cycle-tours/san-martino-di-castrozza-primiero-vanoi/cycling-in-san-martino-di-castrozza-primiero-vanoi/1436830/>





White Water Rafting


Another favorite activity for families and individuals. There are several areas where this can be done, though none immediately adjacent to San Martino. See: <https://www.checkyeti.com/en/rafting-canyoning/italy/san-martino-di-castrozza/rafting-tours>



Leisure Activities:

The area has many leisure activities. These include sports such as golf and tennis, and adventure parks.

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Format / Schedule

There will be a single speaking session each day each with seven (or more) talks. There are no posters. These sessions will be held either in a conference room at the hotel or in a nearby city conference center, the choice depending on attendance.

Normal talk duration will be 30 minutes including questions and discussion. However, if there are more than 42 - 48 presenters, then some talks will be assigned shorter time limits, or the organizer will choose those to speak. Information on submitting proposals for presentations is on the page of this website labeled "Talk Submissions".

The conference will start with registration and a reception at about 15:15 on Wednesday, July 14. On subsequent days there will be drinks and light snacks from about 15:45 - 16:15, followed by a speaking session. Dinner at the hotel will follow the session at about 20:00 - 20:15.

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Submissions of Talks and Posters

Whether or not you have already sent some of this information to the organizer by email, please provide on the link below a list of authors (with the presenter indicated), their affiliations, and emails; a title, and an abstract (limit 250 words). These may be changed later, so do not hesitate to send them as early as possible. The organizer will use these to plan the conference and organize the sessions.

Please go to the [submission form](#)

If attendance allows regular length talks, these will be limited to 30 minutes, a time that includes interruptions for questions, and final discussion. It would be best to plan for 20-24 minutes of actual speaking. The talks should be aimed not at specialists, but at a general scientific audience. Note: In order to add this information to the webpage you should use the same code that you will use to make lodging reservations. This code can be obtained by emailing the organizer at

There is room on the program for about 42 30-minute talks (perhaps 48 25-minute talks). If there are more attendees wanting to present research than time permits, then the organizer will either choose some talks to be of shorter duration, or in extremity, decide which attendees will give presentations. Thus when registering and filling out the submission form, please indicate if you might be willing to 1) give a shorter talk; 2) forego giving a talk.

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ASIC CONFERENCES and WEBSITES:

(clicking on any site from 2005 and later will bring you to that ASIC
website)

- 2002: Squamish, British Columbia
- 2003: Squamish, British Columbia
- 2004: Cavalese, Dolomites, Italy
- 2005: Briancon, France
- 2006: Andalsnes, Norway
- 2007: Kalymnos, Greece
- 2008: Madonna di Compiglio, Dolomites, Italy
- 2009: Aosta, Aosta Valley, Italy
- 2010: Bend, Oregon
- 2011: Boi Valley, Pyrenees, Spain
- 2012: Cala Gonone, Sardinia, Italy
- 2013: Cortina d'Ampezzo, Dolomites, Italy
- 2014: Moab, Utah
- 2015: Mammoth Lakes, California
- 2016: Selva, Val Gardena, Dolomites, Italy
- 2017: Interlaken, Switzerland
- 2018: Loano, Italian Riviera, Italy
- 2019: Seefeld, Austria
- 2021: San Martino di Castrozza, Italy
- 2022: Chamonix, France
- 2022: Queenstown, New Zealand
- 2023: Kranjska Gora, Slovenia

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Contact Information:

Conference Organizer

Rich Shiffrin
Indiana University - Bloomington

Tel: [redacted]
Fax: [redacted]

Webmaster/Conference Coordinator

Please direct questions concerning the website to the webmaster(s): Ruth Eberle
Phone: (812) [redacted]

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Email preferred but if necessary address correspondence to:

**Annual Summer Interdisciplinary Conference (ASIC 2016)
c/o Prof. Richard Shiffrin
Psychological and Brain Sciences Department
Indiana University
1101 E. 10th St.
Bloomington, IN 47405**

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Mer de Glace View

When you want to post your talk title, abstract, and authors, email Rich Shiffrin who will send you the code to enable you to do so.

Authors, Titles, Abstracts, Presentations

IMPORTANT:

The ASIC speakers and attendees, whether world famous scientists or graduate students, expect to hear, and are used to hearing state-of-the-art leading-edge research. However: ASIC is an interdisciplinary conference and always has a diverse audience, Thus **DO NOT** give a talk aimed at your co-authors, laboratory colleagues, or even experts in your research domain: **GIVE A TALK ACCESSIBLE TO AND UNDERSTANDABLE BY THE DIVERSE ASIC ATTENDEES.**

Listing by speaker

Speaker	Allen, Colin
Author 1	Allen, Colin University of Pittsburgh
Title	Cognitive Paleoethology of Working Memory
Abstract	There have been attempts to estimate the working memory capacity of our earliest hominin ancestors (e.g. Read 2008). The inferences involve comparison with chimpanzees, and extrapolations from cranial capacity measured from fossils. I will critique the narrow focus on capacity and draw upon more recent comparative work (Völter et al. 2019) and neuroscientific work (Lorenc et al. 2021) to argue instead that a focus on the larger system in which working memory is situated provides a better path towards strong inferences about cognitive evolution in the earliest Homo species some 2 million years ago.

Speaker	Breithaupt, Kira
Author 1	Breithaupt, Kira Indiana University
Author 2	Leite, Abe Indiana University
Title	Persistent Common Structure as a Measure of Analogic Similarity
Abstract	Analogy-making is a powerful component to our way of making sense of the world. Everything from our perception of concepts, to how we assess the proximity of ideas, and to how we transfer experiences from one to another involve analogy, and are areas of research that would benefit from having a realistic model of analogy-making. In order to better understand how analogy works in analogy-making agents, we first need to explore how analogy-making *could* work. In this talk I will address the question 'which mathematical functions might instantiate the process of analogy?' I will propose a computational model of general analogical comparison that accounts for: (1) the proposition that it is not the identity of components of an entity that matter for abstract relation, but the structural relationships between those components; and (2) that analogic relation operates unconstrained by any incompatibility between mediums. Preliminary data for falsification from two domains (one toy-case and one grounded example) will be offered.

Speaker	Breithaupt, Fritz
Author 1	Breithaupt, Fritz Indiana University, Cognitive Science & Germanic Studies
Author 2	Li, Binyan Indiana University, Cognitive Science

Author 3	Kruschke, John Indiana University, Psychological and Brain Sciences
Title	The Narrative Mind: Serial Reproduction of Narratives
Abstract	How do narratives organize experiences, memory, and cognition? The current standard model of narrative discourse processes focusses on the causality of why who did what to whom when and where (rooted on Bartlett, 1932; Mandel & Johnson, 1977; Zwaan, Langston & Graesser, 1995). In contrast, we find in several serial-reproduction experiments with up to 12,840 participants that emotions play an underappreciated role in narrative cognition. Our data show a decay of perceived causality, but stability of some emotions, esp. happiness, sadness, embarrassment, and surprise. Based on these findings, we propose a two-phase model of story retelling that suggests that certain emotions operate as anchors for remembering and retelling stories. I will offer a possible, but partly speculative explanation of this finding: When we start to think in narratives, we are promised an emotion. Emotions operate as rewards of narrative experience and cognition.

Speaker	Carstensen, Alex
Author 1	Carstensen, Alex Stanford University
Title	Language as a window into abstract thought
Abstract	Human perception is limited to a handful of concrete sensory modalities, but even young children manage to construct complex and highly abstract concepts, demonstrating a fluency with both conceptual and linguistic abstraction that outstrips other animals by the preschool years. How do humans accomplish the feats of abstraction that set them apart? My research addresses this question by probing the structure, mechanisms, and development of abstract thought and its relations to language. I will present work characterizing abstract thought through three complementary approaches: (1) measuring typological consistency and variation in word meanings and nonlinguistic categorization across languages, (2) using experimental interventions to inform computational models of interactions between language and thought, and (3) examining the developmental time course of abstract reasoning across cultures. These studies in the domains of spatial relations (like in and on), frames of reference (left vs. north), and relational reasoning (about same and different), reinforce an emerging consensus on the relation of language and thought, by which all people share a universal conceptual foundation that can be altered substantively by both language and the environment.

Speaker	Chen, Thomas

Author 1	Chen, Thomas Academy for Mathematics, Science, and Engineering
Author 2	Chen, Thomas Yu
Title	Convolutional Neural Networks for Building Damage Classification in Satellite Imagery
Abstract	Natural disasters ravage the world's cities, valleys, and shores on a monthly basis. Having precise and efficient mechanisms for assessing infrastructure damage is essential to channel resources and minimize the loss of life. Using a dataset that includes labeled pre- and post- disaster satellite imagery, the xBD dataset, we train multiple convolutional neural networks to assess building damage on a per-building basis. In order to investigate how to best classify building damage, we present a highly interpretable deep-learning methodology that seeks to explicitly convey the most useful information required to train an accurate classification model. We also delve into which loss functions best optimize these models. Our findings include that ordinal-cross entropy loss is the most optimal loss function to use and that including the type of disaster that caused the damage in combination with a pre- and post-disaster image best predicts the level of damage caused. The highest accuracy percentage on the testing set that we achieve is 74.6%; the non-optimal nature of this is largely attributed to the limited discernibility between the major and minor damage categories. We also make progress in the realm of qualitative representations of which parts of the images that the model is using to predict damage levels, through gradient class-activation maps. Our research seeks to computationally contribute to aiding in this ongoing and growing humanitarian crisis, heightened by climate change. Specifically, it advances more interpretable machine learning models, which were lacking in previous literature.

Speaker	de Kleijn, Roy
Author 1	De Kleijn, Roy Leiden University
Title	Evolutionary algorithms in computational creativity
Abstract	Creating agents that generate creative artifacts requires the use of a reward or fitness function that quantifies the quality of the created artifact in terms of creativity, originality, visual pleasantness, et cetera. In this talk, I will discuss some recent experiments that we have done using Neatures, an evolutionary robotics implementation that produces visual artifacts in the form of a canvas. Manipulating the sensory input of the agent's own generated canvas results in different types of art produced. Many questions remain, however. How can we automate the fitness or reward function, i.e. what algorithms can judge the creativity of an artifact? How do these findings relate to what we know about human creativity? I'm looking forward to an interesting discussion!

Speaker	DeDeo, Simon
Author 1	DeDeo, Simon Carnegie Mellon University & the Santa Fe Institute
Author 2	Na, Robin W. Carnegie Mellon University
Title	Argument-making in the Wild
Abstract	Argument-making, the giving of reasons to believe something, is a central feature of modern life. Ideas spread and are selected for in part because of the arguments we can make on their behalf. While long-standing philosophical accounts parse arguments into deductive, inductive, and potentially abductive patterns, we know very little about the patterns people actually deploy in real-world situations. This leaves us blind to a key selection mechanism in the cultural evolution of ideas. To address this gap, we combine simple tools from natural-language processing with a corpus of over one million argument-making posts in the Reddit forum r/changemyview, the “rationalist” website LessWrong, and a corpus of academic articles in philosophy. Our analysis reveals a system of argument-making patterns entirely distinct from the traditional Aristotelian taxonomy. In particular, we show the existence of a certainty-doubt pattern, associated with arguments that compare and contrast relative confidence, a category-making pattern, associated with arguments that consider the sharpness or vagueness of category boundaries, and a question-rephrasing pattern, associated with revising and rewriting a standard view. These provide new insights into social cognition, the dynamics of argument-making in interpersonal exchanges, and the ways that ideas may thrive, or not, on the basis of the argument-patterns they make possible.

Speaker	Heathcote, Andrew
Author 1	Heathcote, Andrew University of Newcastle, Australia
Author 2	Tanis, Charlotte University of Amsterdam
Author 3	Zomerdijk, Jonne University of Amsterdam
Author 4	Blanken, Tessa University of Amsterdam
Author 5	Matzke, Dora University of Amsterdam
Author 6	Borseboom, Denny University of Amsterdam

Title	Minds for Mobile Agents
Abstract	<p>We model large sets of interacting mobile agents whose movement choices are determined in a discrete-choice random-utility framework spanning simple multinomial logit models to crossed-nested logit models that account for velocity-related correlations. The agents are predictive, so their choice utility is in part based on projecting the future positions of other agents they observe. They can have diverse characteristics and individual movement plans consisting of goals about visiting sets of locations. When a plan is disrupted through interactions with other agents in crowded scenarios, they can dynamically create sub-goals to enable them to return to complete their mission. Additive combinations of choice utilities provide a method to combine, weight, and resolve sets competing demands from goals (e.g., heading to the next location), individual preferences (e.g., for speed and inter-personal distance), rules (e.g., passing on the right) and social factors (e.g., following a leader and grouping). We report simulations showing that these agents can competently navigate and achieve their goals in difficult environments and results on Bayesian estimation of agent parameters from movement data. We discuss the potential for this framework to build, parametrize, explore, and predict systems of agents guided by complex and flexibly specified cognitive states</p>

Speaker	Hoffmann, Janina
Author 1	Hoffmann, Janina University of Bath
Author 2	Albrecht, Rebecca University of Basel
Author 3	Von Helversen, Bettina University of Bremen
Title	Coordinating several mental strategies requires integration: Evidence from human judgment
Abstract	<p>Individuals solve many real-world problems by applying distinct mental strategies, requiring them to coordinate strategy use. Theories of the mind often postulate that individuals apply only one strategy at a given time, implying shifting between strategies. On the flip side, integrating or blending knowledge from several strategies frequently proves beneficial. We demonstrate in a generalized learning model that developing domain-specific strategies is only possible if people keep more than one strategy active at any given point in time, ruling out trial-by-trial strategy shifts. We test model predictions against human performance in the domain of judgment. Simulations show that the model replicates how individuals coordinate memory and rule-based strategies. Results from two experiments in which individuals made judgments for rules and exceptions support the conclusion that strategy-blending better predicts than strategy-shifting how individuals learn to coordinate</p>

memory- and rule-based strategies. Learning models thus provide a suitable tool for understanding strategy coordination.

Speaker	Kachergis, George
Author 1	Kachergis, George Stanford University
Author 2	Frank, Michael C.
Title	Engineering the statistics of the environment: How people shape their experience to promote learning
Abstract	We often think of infants as largely helpless, passive observers of their complex visual and language environment. Yet from an early age, children guide their acquisition of new information through selective attention (e.g., head and eye movements) and active inquiry (e.g., grasping objects). Word learning exemplifies a key performance measure in this process of self-directed learning, requiring children to judge when to consolidate the familiar and when to absorb the new. I first present an accumulator-based psychometrics model that can be used to explain variability in the word-by-word growth of individual children's vocabulary. I then present a large-scale comparison of several cognitive models of word learning, show how some seemingly distinct models mimic each other, and discuss the mechanisms of selective attention that best explain data across many experiments. Finally, I show how this cognitive model can be extended to explain how children and adults actively manipulate their environment for faster learning, and suggest that active learning is a key component of early word learning.

Speaker	Lewandowsky, Stephan
Author 1	Lewandowsky, Stephan University of Bristol
Title	The Knowledge Dementors
Abstract	We are said to live in a "post-truth" era in which "fake news" has replaced real information, denial has compromised science, and the ontology of knowledge and truth has taken on a relativist element. I argue that to defend evidence-based reasoning and knowledge against those attacks, we must understand the strategies by which the post-truth world is driven forward. I depart from the premise that the post-truth era did not arise spontaneously but is the result of a highly effective political movement that deploys a number of rhetorical strategies. I present evidence for the existence of several such strategy and their impact, and how those strategies might be countered. I focus in particular on the role of "inoculation" in creating resilience against misinformation.

Speaker	Maraver, María J.
Author 1	Maraver, María J. University of Lisbon
Author 2	Lapa, Ana University of Lisbon
Author 3	Garcia-Marques, Leonel University of Lisbon
Author 4	Carneiro, Paula University of Lisbon
Author 5	Raposo, Ana University of Lisbon
Title	Retrieval enhances the correction of false memories using pragmatic inference sentences
Abstract	Errorful learning implies that a generated error can enhance future learning if followed by feedback. Here, we test this hypothesis using sentences including pragmatic sentence implications, a paradigm traditionally used for the study of false memories for everyday actions. Memory of younger adults was compared across groups as a function of the type of task performed (retrieval or presentation of the information) and whether they received feedback or not. Across two experiments, we found that corrective feedback is more effective when given after errors committed during active retrieval than when being exposed to the information (either on a restudy or a passive recognition condition). We suggest that the act of retrieval enhances memory malleability and hence promotes the incorporation of updated information.

Speaker	Matzke, Dora
Author 1	Matzke, Dora University of Amsterdam
Title	Flexible cognitive architectures for response inhibition
Abstract	Response inhibition—the ability to stop ongoing responses that have become no longer appropriate—is a central component of executive control and is essential for safe and effective interaction with an ever-changing and often unpredictable world. Inhibitory ability is typically quantified by the stop-signal reaction time, the completion time of an inhibitory process triggered by a signal to stop responding. Because stop-signal reaction times cannot be directly observed, they must be inferred based on a model in which independent inhibitory (“stop”) and response (“go”) processes race with each other to control behavior. I review the limitations of the traditional non-parametric race model framework and show that it cannot be used to investigate response inhibition in the full range of situations and paradigms that are relevant to the study of cognitive control. To address this shortcoming, I outline a flexible parametric

approach that generalizes the race model to account for aspects of behavior that are characteristics of real-world stopping, such as choice errors, attentional lapses, and the interaction between the stop and go processes. I propose various parametrizations of the framework, ranging from the descriptive ex-Gaussian distribution to a racing diffusion evidence-accumulation architecture, explore the strengths and weaknesses of the different models, and illustrate their utility with clinical and experimental data in choice-based as well as anticipated-response-based paradigms. I end with discussing the potential of this modeling framework to provide a comprehensive account of the mental processes governing behavior in realistically complex situations, and how it may contribute to the prediction of stopping performance in dynamic settings.

Speaker	Oberauer, Klaus
Author 1	Oberauer, Klaus University of Zurich
Author 2	Mizrak, Eda University of Zurich
Title	Why is Time Good for Working Memory?
Abstract	The passage of time is commonly thought of as the scourge of memory, in particular short-term or working memory: Prominent theories assume that working memory representations decay over time. Researchers' focus on time-related forgetting has contributed to a neglect of the beneficial effects of time for short-term maintenance: Longer time between presentation of successive items of a memory set (i.e., inter-item time), usually improves performance. I will present a series of experiments testing several hypotheses for explaining that effect: (1) People use the free time for strengthening memory representations of already presented items, either through rehearsal, attentional refreshing, or elaboration. (2) Longer time enables better short-term consolidation. (3) Longer time between items increases their temporal distinctiveness. These hypotheses differ in what they predict for which items of a memory list benefit from longer time: (a) Rehearsal, refreshing, and elaboration predict the benefit to be retroactive (affecting already encoded items) and global (affecting all earlier items). Short-term consolidation predicts a local effect, benefitting only the most recently encoded item (retroactive), and perhaps the following one (proactive). Temporal distinctiveness predicts a predominantly local benefit (both retro- and proactive). Our results refute all these predictions: The beneficial effect of free inter-item time is global and proactive. The best available explanation for it so far is that encoding of an item depletes a limited resource, which is gradually replenished in the following inter-item interval (Popov & Reder, 2020), thereby increasing encoding resource for subsequent items.

Speaker	Plancher, Gaën
Author 1	Plancher, Gaën University of Lyon
Author 2	Labaronne, Maximilien University of Lyon
Title	Dynamic interactions between working memory maintenance mechanisms and long-term memory representations
Abstract	<p>Contradictory results in the literature show that attentional refreshing cannot operate efficiently in the absence of semantic representations, while at the same time it does not rely directly on retrieval from semantic memory. In our study, we tried to better understand the links between attentional refreshing and long-term memory, by assessing how working memory maintenance mechanisms are modulated by prior long-term content. Using working memory tasks, participants were either required to memorize words or pseudowords. In addition, the repetition of the memoranda was manipulated throughout the experiment, they were presented either 1, 2, or 3 times, allowing or not a progressive consolidation into long-term memory. We reasoned that perhaps a semantic representation is not necessary for refreshing to operate but a stable memory representation is. In experiment 1, participants performed a simple span task. We manipulated the maintenance strategies by giving direct instructions to participants: either verbally rehearse or refresh the memoranda. In experiment 2, participants performed a complex span task. We manipulated the maintenance strategies by varying the cognitive load of the concurrent task. In both experiments we observed an effect of maintenance mechanisms on pseudowords: in experiment 1 we observed better immediate recall for verbal rehearsal compared to refreshing and the reverse at delayed recall; in experiment 2 we observed better performance at low cognitive load compared to high cognitive load at both immediate and delayed recalls. Repetitions allowed consolidation into long-term memory as delayed recalls were better when items occurred 3 times compared to 1 time. However, this effect never interacted with maintenance mechanisms, suggesting that a progressive consolidation into long-term memory does not modulate the effect of maintenance mechanisms. Our results suggest that attentional refreshing, but also verbal rehearsal, can operate in the absence of semantic representations.</p>

Speaker	Ressler, Susanne
Author 1	Ressler, Susanne The University of Texas at Austin
Title	The Structural Basis of Synapse Connectivity
Abstract	Proper brain function is based on neuronal networks, which are based on synapses, the fundamental unit of neuronal

communication. Synaptic adhesion proteins bind across the synaptic cleft to form complexes tethered to both pre- and post-synaptic membranes. Dysfunction of synaptic adhesion proteins cause brain disorders, 'synaptopathies'. An emerging theme shows that members of C1q/TNF superfamily have been adapted during evolution to act in various physiological roles by binding to specific receptors. Secreted C1Q-like proteins have been increasingly recognized as master-regulators of tissue organization and receptor-triggered pathways for crucial cellular responses and communications in higher organisms. C1QL proteins are the only known ligands to the adhesion GPCR B3 (ADGRB3) associated with cognitive brain disorders and various types of cancers. By their interaction with receptors, synapse organizers facilitate the process of synapse formation, maintenance and elimination – synapse homeostasis. To investigate the hypothesis that the secreted C1QL proteins may mediate tripartite trans-synaptic adhesion complexes, we conducted an in vivo interactome study and identified new binding candidates. We demonstrate that C1QL3 can mediate a novel cell-cell adhesion complex involving ADGRB3 and two neuronal pentraxins, NPTX1 and NPTXR. Single cell RNA-Seq data from cerebral cortex shows that C1QL3, NPTX1, and NPTXR are highly co-expressed in the same neurons, suggesting that all three proteins could be pre-synaptically co-secreted and capable of binding to post-synaptically localized ADGRB3. Identifying new binding partners for C1QL proteins and deciphering their underlying molecular principles will allow us to understand how C1QL3 protein affects the organization and function of excitatory synapses

Speaker	Shiffrin, Richard
Author 1	Shiffrin, Richard Indiana University
Author 2	Harding, Sam Syracuse University
Author 3	Cousineau, Denis University of Ottawa
Title	The Dynamics of Perception and Decision
Abstract	Does perception operate holistically in a single step, even for well known visual objects? Two studies with associated modeling reveal that perception and decision operate together in stages. The first study presented an overlearned object with four features, two of which were diagnostic for a target response. The features were presented simultaneously or successively at speeds making the presentation appear simultaneous. When successive the two diagnostic features could be first or last. The analysis and modeling of the accuracy and speed of binary responses revealed that features were perceived separately as time passed, with evidence growing in

accord with the currently perceived features. The second study was similar but used just two features and used cursor movements to obtain responses. A Hidden Markov Model was used in association with a perception/decision model to analyse the cursor movements, and revealed moment by moment changes in feature perception and decision.

Speaker	Steyvers, Mark
Author 1	Steyvers, Mark University of California, Irvine
Title	Human-AI Complementarity
Abstract	Artificial intelligence (AI) and machine learning models are being increasingly deployed in real-world applications. In many of these applications, there is strong motivation to develop hybrid systems in which humans and AI algorithms can work together, leveraging their complementary strengths and weaknesses. We develop a Bayesian framework for combining the predictions and different types of confidence scores from humans and machines, allowing us to investigate the factors that influence complementarity, where a hybrid combination of human and machine predictions leads to better performance than combinations of human or machine predictions alone. We apply this framework to a large-scale data set where humans and a variety of convolutional neural networks perform the same challenging image classification task. We show empirically and theoretically that complementarity can be achieved even if the human and machine classifiers perform at different accuracy levels as long as these accuracy difference falls within a bound determined by the latent correlation between human and machine classifier confidence scores. In addition, we demonstrate that hybrid human-machine performance can be improved by differentiating between the errors that humans and machine classifiers make across different classes. Finally, our results show that eliciting and including human confidence ratings improves hybrid performance in the Bayesian combination model. Our approach is applicable to a wide variety of classification problems involving human and machine algorithms.

Speaker	Testolin, Alberto
Author 1	Testolin, Alberto Department of General Psychology and Department of Information Engineering, University of Padova
Author 2	Sabathiel, Silvester Norwegian University of Science and Technology
Author 3	Petruzzellis, Flavio Department of Mathematics, University of Padova

Title	The challenge of modeling the acquisition of mathematical concepts
Abstract	Mathematics is one of the most impressive achievements of human cultural evolution. Despite we perceive it as being overly abstract, it is widely believed that mathematical skills are rooted into a phylogenetically ancient “number sense”, which allows to approximately represent quantities. However, the relationship between number sense and the subsequent acquisition of symbolic mathematical concepts remains controversial. In this talk I will discuss how recent advances in AI and deep learning research might allow to investigate how the acquisition of numerical concepts could be grounded into sensorimotor experiences and could be boosted through the interaction with material representations. Success in this challenging enterprise would have immediate implications for cognitive science, but also far-reaching impact for educational practice and for the creation of the next generation of intelligent machines.

Speaker	Wagenmakers, Eric-Jan
Author 1	Wagenmakers, Eric-Jan University of Amsterdam
Title	From p-values to Bayesian evidence
Abstract	Despite its continuing dominance in empirical research, the p-value suffers from a series of well-known statistical limitations; for instance, it cannot quantify evidence in favor of the null hypothesis, it cannot be monitored until the results are sufficiently compelling, and it tends to reject the null even when the evidence, I present a simple set of equations that allow researchers to transform their p-values into an approximate objective Bayes factor for the test of a point null hypothesis against a composite alternative. The transformed quantity is able to quantify evidence in favor of the null hypothesis, may be monitored until it is sufficiently compelling, and does not reject the null when the evidence is ambiguous.

Speaker	Wierzchoń, Michał
Author 1	Wierzchoń, Michał Jagiellonian University, Institute of Psychology, Consciousness Lab
Author 2	Łukowska, Marta Jagiellonian University, Institute of Psychology, Consciousness Lab
Author 3	Osiński, Dominik Department of Electronic Systems, Faculty of Information Technology and Electrical Engineering, Norwegian University of Science and Technology, Trondheim, Norway
Author 4	Weronika, Kałwak Qualitative Research Lab, Institute of Psychology, Jagiellonian University, Krakow, Poland

Title	How to design a sensory substitution device?
Abstract	SSDs allow us to study the emergence of new perceptual experience qualities. Proposed as assistive technology for the visually impaired, they have not become popular. The reason might be a dominance of the generalist approach to SSDs design, where SSDs substitute lost visual functions. However, the functionalist approach suggests focusing on specific functions important for the user. Here, we discuss the issue based on the existing literature with various SSDs and our own studies advocating for the latter approach. In our longitudinal study with sighted, blindfolded participants, we found a predominance of action- over perception-oriented strategy when using Colorophone (v.1.0) - a colour-to-sound SSD. Participants who used the device to plan exploratory actions rather than focused on vision-related qualities experienced greater progress throughout 72-days training. Moreover, in participants who progressed in training, we found greater activity in the regions specialised in motion processing. Together with the observed neuroplasticity in the dorsal visual stream, the results suggest that the SSD supported online action planning rather than a visual-like experience. We conclude by discussing the usefulness of the functionalist approach to SSD design and the consequences of the approach to the debate on the nature of the experience induced by SSDs.

Speaker	Wierzchoń, Michał
Author 1	Wierzchoń, Michał Jagiellonian University, Institute of Psychology, Consciousness Lab
Author 2	Hobot, Justyna Jagiellonian University, Institute of Psychology, Consciousness Lab
Author 3	Siedlecka, Marta Jagiellonian University, Institute of Psychology, Consciousness Lab
Title	Effects of perception and action on visual awareness judgments
Abstract	Recent studies suggest that action may influence visual awareness. This work reports studies investigating how action influences visual awareness judgments on a behavioural and neuronal level. The studies applied perceptual discrimination task. In E1, a threshold stimulus was followed by an arrow requiring a motor response irrelevant to the task. This response could be congruent, incongruent, or unrelated to the correct response required in the discrimination task. After reacting to the arrow, participants rated their stimulus awareness using the Perceptual Awareness Scale (PAS) and then carried out their discrimination response. Participants reported a higher level of stimulus awareness after carrying out responses that were either congruent or incongruent with the response required by the stimulus, compared to the neutral condition. In E2, we used a single-pulse Transcranial Magnetic Stimulation (sp-TMS) to excite the primary motor cortex (M1). Delivering sp-TMS to M1 resulted in higher average PAS ratings

than the control stimulation condition, but only in trials where stimulation was congruent with the following identification task response. We also measured motor evoked potentials (MEPs) and showed that they might indirectly measure perceptual and non-perceptual evidence accumulated for visual awareness ratings. Based on the results of our studies and other experiments reported in the literature, we argue that activity in the motor cortex influences visual awareness judgments. We also discuss the possible mechanisms that underlie these influences on both the cognitive and the neural levels. We propose that action may affect visual awareness judgments because (1) it serves as additional information in the process of evidence accumulation; (2) it restricts the number of alternatives in the decisional process; (3) it enables error detection and performance monitoring; or (4) it triggers attentional mechanisms that modify stimulus perception. We also discuss the possible neuronal mechanisms of the effects above.

Speaker	Zorzi, Marco
Author 1	Zorzi, Marco University of Padova, Italy
Title	Number sense in humans and machines
Abstract	I will offer a computational perspective on the emergence of number sense - the ability to perceive and represent the numerosity of object sets - that emphasises the role of experience-dependent generative learning and the presence of inductive biases to explain putative "innate" numerical skills. I will discuss computer simulations with unsupervised deep neural networks (deep belief networks) that learn a hierarchical generative model of images of object sets without receiving any information about numerosity. These simulations reveal that numerosity is a high-order summary statistics of images and shed light on the nature of the computations underlying visual numerosity perception, the interplay between numerosity and continuous visual properties, and the conditions that lead to biased numerosity judgements. I will then discuss the more challenging task of generating images containing a desired number of objects and how this can be achieved by state-of-the-art generative models known as "transformers". The transformer generates images of object sets with numerosity distributions matching the performance of pre-counting children in a number generation task.

Contact **with questions.**