ASIC 2013

Twelfth Annual Summer Interdisciplinary Conference

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A refugio in the mountains near Cortina d'Ampezzo

Grand Hotel Savoia
Cortina d'Ampezzo
Dolomites, Italy
July 24, Wednesday – July 30, Tuesday, 2013

Announcing ASIC 2013

The Twelfth Annual Summer Interdisciplinary Conference (ASIC 2013) will be held at the Grand Hotel Savoia, in Cortina d/Ampezzo, in the Dolomites of northern Italy. The dates are chosen to make it possible for attendees to travel on July 30 to Berlin for the Cognitive Science Conference Aug 1-4 and the Mathematical Psychology Conference Aug 4-7.

Grand Hotel Savoia (not the refugio shown above--see the lodging page on this website) is a five star hotel with spa facilities. The hotel website is at: http://www.grandhotelsavoiacortina.com/

The closest international airports are at Venice and Innsbruck, both about 150 km distant. The hotel may be reached from these airports by car, train+bus, or bus.

Cortina d'Ampezzo is the major resort town in the Dolomites, and was once the site of the Winter Olympics. It is surrounded by Dolomite mountain groups, many with lifts that

operate in the summer and bring visitors high in the mountains to hiking trails, biking trials, climbing areas, rifugios, and via ferrata. The area offers activities too many to list here (but see the link 'Activities').

Richard M. Shiffrin of Indiana University - Bloomington is the organizer: Email correspondence should be directed to University or mailed to Richard M. Shiffrin at Indiana University -- select 'Contact' from the menu for the address.

ASIC 2013 Organizer, Rich Shiffrin, atop Torre Grande, near Cortina

The subject matter of the ASIC conferences is interdisciplinary, 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. The conference is open to all interested parties, and an invitation is NOT needed to attend. However, due to the small number of spots for speakers, the organizer will select the attendees to give talks, and choose the lengths of talks.

Previous Years' Websites

Several parts of this year's website are still under construction. For examples of websites for other ASIC conferences, visit ASIC 2012, ASIC 2011, ASIC 2010, ASIC 2009, ASIC 2008, ASIC 2007, ASIC 2006 and ASIC 2005.

Invitation

The conference is open to all scholars who fit the very general theme of the conference, and their family and friends. An individual invitation is NOT needed. We encourage you to send the conference information to friends and colleagues.

Conference Aims

The conference will cover a wide range 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.

Lago Misurina, a few km east of Cortina

Conference Format

There is a single speaking session each day. In past conferences we have had seven 30 minute talks each evening. If the number of attendees is larger than usual this year, the speaking time will be extended by 30 minutes, allowing six additional talks, 48 in all. If this number is insufficient, one day will be devoted to shorter talks (no shorter than 15 minutes). If the number of speakers exceed 56, then the organizer will decide which attendees will speak.

Information on submitting proposals for presentation is on the page of this website labeled "Talk Submissions". Please submit talk information on the website, even if you have already sent (some of) this information to the organizer. Please note: It is important to indicate your strength of preferences for speaking, as requested on this form.

The conference will start with registration and a reception with wine beer, drinks and food from 15:30-16:15 on Wednesday, July 24. On subsequent days there will be drinks and light snacks from ~16:00 - 16:15, followed by a session of seven (or more) spoken presentations that include a mid-session drink break. The finish time and the start of dinner will depend on the decision (to be made later) about session duration.

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 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 and following the conference.

Tre Cime di Lavaredo: Famous Dolomite Towers near Cortina

Registration

You are not officially on the request list for presenting research until you send the registration fee. Visit the Registration page at this website.

Lodging

A block of 'standard' 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.

Location:

The hotel is about two blocks downhill from the center of town on the main road into town (one way toward the town center). It is on Via Roma 62. If one approaches from the east on SS51 (d'Alemagna) follow the one way traffic onto Via Roma and the hotel is on the left.

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Registration Information for ASIC 2013

If you are planning to attend ASIC 2013, please fill out the registration form and submit your registration fee. This fee (slightly higher than in previous years, because this is a 5-star hotel) pays for rental of the conference room, equipment rentals, snacks and drinks at conference breaks, the opening reception, and several charges for drinks at dinner.

This year's fee schedule, in US dollars:

Prior to Jan. 1, 2013	$200
Jan. 1, 2013 - March 1, 2013	$275
After March 1, 2013	$350

In addition to the registration fee per person, you may purchase additional guest vouchers for other persons attending the opening reception (20 euros), breaks (10 euros per day).

Registration and payments are made via the Indiana University Conference Bureau as indicated on the registration form.

If a registration payment is made, but the attendee cancels prior to June 1 the registration fee will be refunded minus a $25 handling fee. After June 1 and prior to the conference, a refund will still be made, but the handling fee will rise to $75.

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Submissions of Talks

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Travel To and About
Grand Hotel Savoia
Cortina d'Ampezzo, Italy

It is probably worth exploring the area of Cortina d'Ampezzo with Google Maps, and Google Earth.

HOW TO REACH CORTINA

BY PLANE:

The main international airports are Venice, Italy at 148 km, 1 hr 53 min by car, and Innsbruck, Austria at 164 km, 2 hrs 9 min by car. Other nearby airports are at Treviso (118 km) and Verona (242 km). Flights can be cheaper to Milan Malpensa, but the distance increases to 451 km, and 4.5 hrs by car.

For those attending the conferences in Berlin after ASIC, note that flights from Venice and Innsbruck are frequent and not too expensive. Also attendees should explore flights that route via Berlin (to Venice or Innsbruck). Driving from Berlin is probably not feasible because the distance is 900 km, and driving times are about 9 hours. Trains to and from Berlin are not a good choice due to poor connections and times.

BY TRAIN:

The nearest railway station is located in Calalzo di Cadore at 35 km. The line is Venice or Padova -Calalzo. From the railways station there is a public bus service to Cortina (Cortina Express—see below). One can take trains from Venice of Innsbruck (although the service from Innsbruck takes longer).

BY CAR:

From the south or north one enters or leaves Cortina on SS51. From the east or west one enters and leaves Cortina on SR48.

BY BUS:

There is service from Venice Marco Polo Airport or from Mestre Railway station on the Cortina Express (tel: +39 0436 867350). Time is about 2 Hrs 15 min. Prices in 2012 are 22 Euro.

HOW TO REACH THE GRAND HOTEL SAVOIA

LOCATION:

The hotel is about two blocks downhill from the center of town on the main road into town (one way toward the town center). It is on Via Roma 62. If one approaches from the east on SS51 (d'Alemagna) follow the one way traffic onto Via Roma and the hotel is on the left.

FROM SOUTH

Follow the directions to downtown. At the roundabout, take the one way street straight ahead called Via Roma. The Grand Hotel Savoia is on your left.

FROM NORTH

From Dobbiaco, follow the directions to Venice (Venezia)-Belluno. You will pass in front of the church La Difesa. When at the roundabout turn left along the one way street Via Roma. The Grand Hotel Savoia is on your left.

LOCAL TRAVEL NEAR CORTINA

Walking within the town is easy given the town's size. There are also local public buses--the small orange ones take you to places in the very immediate vicinity. Connections with Dolomitibus at the bus station will take you to the surrounding towns and outlying areas. The frequency varies. The Dolomiti buses are very useful for hikers as they mostly go west and east to the mountain passes, from which cable cars or chair lifts ascend, and bus stops are often positioned at the starting points for hikes. Timetables for all these services are available in the bus station. Combination tickets are available for both buses and lifts and represent a good saving if you plan to be around for several days. (Taxis are generally available but are very expensive, so cars or buses are to be preferred.)

One local bus goes up to the Auronzo hutte/rifugio/mountain inn, which sits directly beside the Tre Cime de Lavaredo, one of the finest mountain massifs in the Dolomites. From the refugio you can walk on a fairly level path anti-clockwise around the mountain, to get the very best views from the far side.

There are many and varied hiking routes, reached by buses, cable cars, gondolas or chair lifts, or on foot. Good maps are available, especially one at 1:25000, which have all the routes marked complete with their relevant numbering (which corresponds to the numbering on the actual paths). The Tourist Office has also a rather basic map which is also useful for orientation purposes. For the most part the routes are well marked in the usual red-white-red flashes common in many parts of the Alps. Google Earth has many marked hikes of varying difficulties that are worth exploring.

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Lodging

We have placed a hold on rooms likely sufficient for our conference needs at the Grand Hotel Savoia in Cortina d'Ampezzo Italy. This is a five star hotel with spa facilities. See 'Travel' for directions and ways to reach the hotel. The hotel website is at: http://www.grandhotelsavoiacortina.com/.(If demand for rooms exceeds supply we will provide information about an alternative nearby hotel).

LODGING RATES:

Lodging rates include breakfast and dinner for each person each day. Lodging reservations should be made early starting in the fall of 2012.

Reservations must be made with 30% deposit.

Cancellation: Deposit will be returned without penalty if cancellation is made by June 25, 2013. Cancellation after June 25 but before seven days prior to the start of the reservation will forfeit the deposit of 30%. Cancellation after seven days prior to the start of the reservation will require payment in full for the entire reserved period.

Rates:

One person/room: E100/day.

Two persons/room (1 or 2 beds upon request): E160/room/day

Three persons (2 or 3 beds upon request): E235/room/day

Children: 0-6 free, and 7-12 E64. Thus, for example:

Ages 0-6: One adult and one or two children E100/room/day; two adults and one child: E160/room/day

Ages 7-12: One adult and one child: E144/room/day; one adult and two children: E208/room/day; two adults and one child: E224/room/day.

TO BOOK A ROOM:

1. **Send an email to saying you are going to attend the conference and wish to book a room. You shortly receive a return email with a code that will allow you to book on the hotel website.**
2. **Go to the hotel website: http://www.grandhotelsavoiacortina.com/**
3. **On the left you will see the heading BOOKING ONLINE. Below enter your reservation dates and so on. Enter the conference code in the box labeled: "Codice cliente"**
4. **Click the box labeled "BOOK NOW" and follow the instructions on subsequent screens.**

For special requests that cannot be entered via the website, please contact the hotel directly.

PARKING:

There is limited free parking on the hotel grounds, both in front and in the rear (totaling

about 15 spaces), available on a first come first serve basis. If no spaces are available, or if extra security is desired, there is a secure parking garage under the hotel that is served by valet parking at a special conference rate of 10 euro/day. Free city parking, on a first come first serve basis, is available in two locations, the nearest about 900 meters distant from the hotel.

INTERNET:

Wireless internet (WIFI) is free to participants, both in rooms and public areas.

ADDRESS and TELEPHONE

Grand Hotel Savoia, Via Roma, 62 - 32043 Cortina d'Ampezzo
Tel: +39 0436 3201
Fax: +39 0436 869186
Email:

FACILITIES and SERVICES

Attendees will have free entry to the swimming pool and sauna. There will be charges for use of the spa and spa services. We have negotiated reduced rates, available upon request. There is a 10% discount for conference participants.

LOCATION

The hotel is about two blocks downhill from the center of town on the main road into town (one way toward the town center). It is on Via Roma 62. If one approaches from the east on SS51 (d'Alemagna) follow the one way traffic onto Via Roma and the hotel is on the left.

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Food/Dining

Cortina is replete with many restaurants, but given the lateness of the conference talks, and the quality of the Savoia Savoy restaurant, the lodging price will be half board, thus including meals at the Savoia hotel. Half board includes an American buffet breakfast and a full dinner each day. Lunches, if desired, can be purchased separately (either at the hotel or at restaurants in town). The hotel also has a 'bar' serving afternoon 'tea'. The registration fee will pay for the food and drink at the opening reception, at the session breaks, and (limited) water, wine, and beer at dinners. The day will begin with an American buffet breakfast from 7:30 -10:30. Earlier service can be arranged upon request the previous day.

Each day after the opening day the conference will begin with light snacks and liquid refreshments at about 16:00-16:15, followed by talks, and a 15 minute break with more drinks about midway through the talks. The first day of the conference (Sunday, June 3) will have a reception with wine, beer, and more elaborate snacks, from 15:30-16:15. Dinner will follow directly after the sessions. The offerings at the dinner will change from day to day, but each day will have choices of meat, fish, and options for vegetarians. Attendees wanting wine, beer, and other drinks beyond those provided can charge to their room.

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Climate, Weather, Clothing

Cortina city center is at an altitude of 1224 m (4015 ft), and is surrounded by Dolomite mountain groups up to a height of 3244 m (10,643 ft). The altitude insures cool temperatures. In late July the average high temperature in town is about 70 degrees F, and the average low is about 50 degrees F. Of course these temperatures can be lower as one heads up into the mountains. Nonetheless the summer sun can be quite hot and sun cream is usually a necessity. July gets more rain than any other month, averaging about 4.3 inches for the month, usually in the form of late afternoon or early evening showers. One should come prepared with rain gear. Those intending activities in the mountains should of course bring appropriate clothing and gear.

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Activities

The picture above shows part of a Via Ferrata, protected hiking paths that are found throughout the Cortina area, and offer exciting and extraordinarily scenic but safe opportunities to explore the heart of the Dolomites. The opportunities for outdoor activities in the summer in the Cortina area are endless, and include walking, hiking, scrambling, Via Ferrata, canyoning, mountaineering, rock climbing, mountain biking, road biking, and parasailing. Cortina is also a center for arts and music in the summer, with many concerts, shows and performances at about the time of our conference. There are also museums, parks and adventure parks, and nearby towns and villages with rich histories.

It is perhaps easiest to get to the start of these activities by car, but there is excellent bus service in an around Cortina, including schedules that stop at the various lifts and access points for activities. A bus schedule is available at the tourist office.

A general website for the Dolomites is found at: http://www.dolomiti.org/dengl/. And the summer website for Cortina is at: http://www.dolomiti.org/dengl/Cortina/ce/index.html

These websites have much useful information, not only about activities, but travel and much more. The tourist office has many maps and brochures and is found at: Piazzetta San Francesco, 8 32043 Cortina d'Ampezzo +39 0436 3235?. This office is about two to three blocks slightly uphill from the hotel, at the town center.

Some Books that could be useful: a) Hiking:

- **Trekking in the Dolomites; Henry Stedman;**
- **UK: ISBN 1-873756-34-8**

- **The Dolomites of Italy; James and Anne Goldsmith;**
- **ISBN 1-55650-162-5; 1-55650-190-0; UK: 0-7136-3128-7**

b) Via Ferrata:

- **Via Ferratas of the Italian Dolomites: Vol 1; Smith and Fletcher;**
- **UK: ISBN: 1-85284-362-4**

- **Via Ferrata-Scrambles in the Dolomites; Werner and Davies;**
- **UK: ISBN 1-85284-089-7**

c) Climbing:

- **Classic Dolomite Climbs; Kohler and Memmel;**
- **US: ISBN 0-89886-693-6; UK: ISBN 1-898573-34-4**

- **Dolomites-Selected Climbs; Ron James;**
- **UK: ISBN 0-900523-55-7**

- **Dolomites East-Selected Clmbs; Ron James;**
- **UK: ISBN 0-900523-65-4**

Many more books can be found on Amazon.com

This section of the ASIC 2013 website will target mainly the various outdoor and adventure activities available in the Cortina area, but there are a variety of other activities that are noteworthy and could of interest to attendees and their guests: I list here a few:

- **A travel itinerary focusing on cheese (and wine): The 'Road of Cheeses'.**
- **Sampling of special local foods, such as turnips, honey, cabbage.**
- **Churches and historical sites in local villages and towns**
- **Museums and historical sites relating to the two world wars, including a World War I Museum high on Monte Piana.**

AREA and DOLOMITE MOUNTAIN GROUPS AROUND CORTINA

The main Dolomite groups surrounding Cortina are listed here. Note that these are large mountain groups, sometimes with many summits and towers, and extending in many case for many km. Not all groups are listed here and within each of these groups there are often many other names of local regions. Access sometimes starts with roads to rifugios, mountain paths from the road, and sometimes with a lift or cable car followed by mountain paths.

Access to climbing, via ferrata, and hiking often begins with one of the many rifugio (high mountain lodges) scattered throughout the area. Because these are large groups, the starting point will depend on one's exact plans. I give here the group name, the maximum height, the approximate distance from Cortina, and the likely nearest highway access.

West

- **Lagazuio 2762 m (SR 48; ~17 km)**
- **Fanes 2980 m (SR48; ~17 km)**
- **Tofane 3244 m (lift access from Cortina)**
- **Cinque Torri 2361 m (SR48; ~18 km)**

North and NW

- **Pomagagnon 2450 m (SS51; ~6 km)**
- **Cristallo 3221 m (SR48; ~7 km)**
- **Tre Cime di Lavaredo 3000 m (SP49; ~15 km)**
- **Cadini 2800m (SP49; ~15 km)**
- **Croda dei Toni 3094 m (SS52; ~45 km)**

East and SE

- **Sorapiss 3205 m (SR48; ~20 km)**
- **Antelao 3264 m (SS51; ~11 km)**

South

- **Pelmo 3168 m (SP251; ~35 km)**
- **Civetta 3220 m (SP 20; ~40km)**

Chairlifts and Cablecars near Cortina d'Ampezzo:

Cortina is surrounded by a system of chairlifts and cablecars essentially all of which are open in the summer. They open at 9 AM, and the last rides down occur at 5 PM. They give access to the higher reaches of the Dolomites; one system of cablecars starts in Cortina and goes all the way to one of the highest peaks in the area (Tofane). These lifts may be used simply for sightseeing, or for ease of access to the most dramatic hiking trails, bike paths, walking paths, via ferrata, or climbing areas. They can be used for one-way trips as well (often walking is done upward, and the lifts are used for descent, to save wear and tear on the knees).

The placement of these various lifts can be found on the hiking or bike maps of the area (available for example in the tourist office) or on: http://mappery.com/map-of/Cortina-dAmpezzo-Hiking-Map

Note that there is a huge system of marked and labeled trails throughout the Dolomites, and these allow connections to and from various lift systems, rifugios, restaurants, via ferrata, and other mountain venues. In a number of cases one has a choice of driving to some lift or taking lower lifts to get to the same site.

I do not list below all lifts in the general Cortina area, but the main ones closest to Cortina. Detailed descriptions with hours and prices may be found on the following website (download the pdfs for each lift):http://www.dolomiti.org/dengl/cortina/ce/escursioni/impianti.html.

In the listing below I give some of the major lifts closest to Cortina, their starting and ending altitudes in meters, and whether the lift is a chair or cablecar.

Lifts near Falzarego-Lagazuoi:

Falzarego - Lagazuoi	2100 - 2742	Cablecar
5 Torri	1889 - 2225	Chair
Fedari	2000 - 2416	Chair

Lifts near Pocol-Tofane:

Rumerlo - Duca d'Aosta	1660 - 2092	Chair
Duca d'Aosta - Pomedes	2092 - 2305	Chair

Cortina - Col Drusche	1250 - 1778	Cablecar
Col Drusche - Ra Valles	1778 - 2472	Cablecar
Ra Valles - Cima Tofane	2472 - 3191	Cablecar

RIFUGIOS:

A typical Rifugio situated scenically

A rifugio is a mini-hotel usually perched on a dramatic and scenic site high in the Dolomites. It generally offers a restaurant (and sleeping accommodations (though sleeping would not be useful except prior to and following the ASIC conference). The Dolomites are famous for their rifugios and many people make multiday hikes (and via ferrata expeditions) from one rifugio to the next, never descending to the 'lowlands'. Such expeditions are highly recommended and attendees who arrive prior to or stay after the conference should consider a multiday expedition from one rifugio to the next.

For conference days, attendees must return by about 16:00 so cannot stay overnight in rifugios, but the rifugios are still very useful, being starting points for day hikes and via ferrata, and nice choices for food and drink during any of the various mountain activities.

Rifugios may be located on the hiking map listed earlier, and the dolomiti website. About 80% have their own websites; e.g.: http://www.dolomiti.org/rifugiopomedes/eng/ferrate.htm

Here is an alphabetical list of some rifugios near Cortina. Altitude in meters is the number given for each. Most have restaurant, bar, café, lodging. Access by lift, car, jeep (4WD), or foot only is indicated, although this information may not be accurate, especially concerning whether one can get access with a regular car.

- **Auronzo: 2320; path, bus, toll road**
- **Averau: 2416; lift/jeep**
- **Biella: 2327; paths**
- **Capana Tondi: see Tondi**
- **Cinque Torri: 2137; car/jeep**
- **Col de Varda: ~2100: lift from Misurina**
- **Col Gallina: 2055; car**
- **Croda da Lago: 2046; jeep**
- **Dibona: 2083; car/jeep/path**
- **Duca d' Aosta: 2098; lift from Cortina, jeep/car**
- **Faloria: 2123; lift/jeep from Cortina**
- **Fanes: 2060; jeep? paths**
- **Fanes Grande: 2102; jeep**
- **Fedare: 2000; lift, car, bus**
- **Fodara Vedia: paths from Sennes and elsewhere**
- **Fonda Savio: path from Misurina or Col de Varda**
- **Giussani; 2580; path**
- **La Varella: 2042; path from Fanes**
- **Lagazuoi: 2752; lift from Falzarego**
- **Lavaredo: 2400; path from Auronzo**
- **Lavarella: see La Varella**
- **Locatelli: ? Path from Lavaredo**
- **Lorenzi: 2932; lift from Son Forcia**
- **Nuvalau: 2574; lift, car + path (toll)**
- **Munt de Sennes: 2245; path from Sennes**
- **Perderu: path from Fodara Vedia**
- **Peze de Paru: 1535; car**
- **Pian di Cengia: 2528; path**
- **Piezza da Aurelio: 2175; car, bus**
- **Pomedes: 2303; lift from Duca**
- **Ra Valles: 2470; lift (restaurant)**
- **Scoiattoli: 2255; lift, car, path**

- **Scotoni: paths from Lagazuoi**
- **Sennes: 2116; jeep**
- **Son Forca: 2215; lift from Rio Gere**
- **Tondi: 2327; path + lift from Faloria**
- **Valparola: 2168; car, bus**
- **La Baita: 1600; car**
- **Passo Giau: 2236; car, bus**
- **San Marco: path from Scotter Palatini**
- **Sasso di Stria: 1935; car, bus**
- **Scotter Palatini: Lift from San Vito Cadore**
- **Vallandro: path from road**
- **Vandelli: 1928; path**

HIKING:

A general introduction and overview is on the hiking map: http://mappery.com/map-of/Cortina-dAmpezzo-Hiking-Map

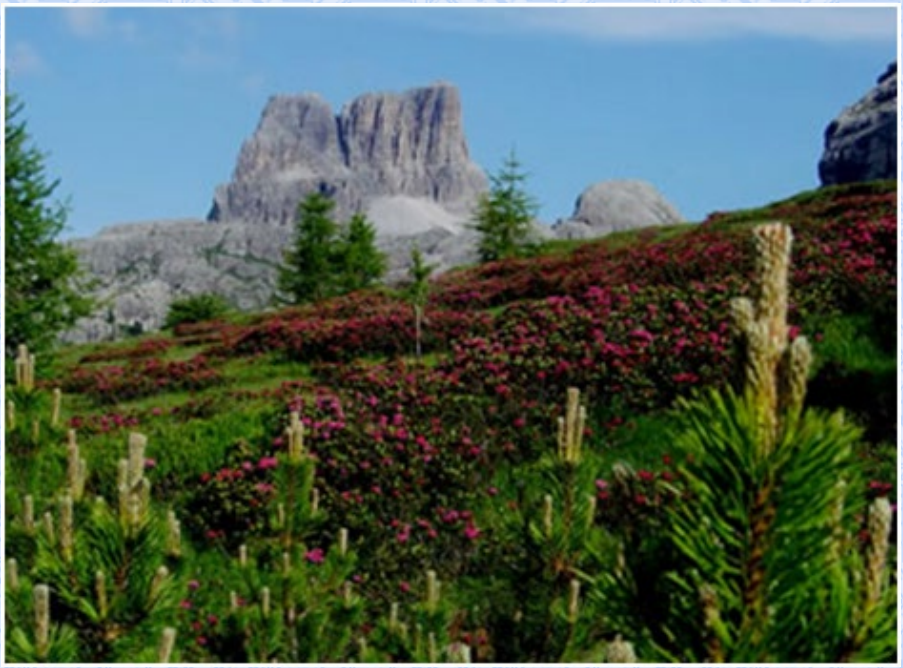
A good introduction is a series of photos in a youtube video: http://www.youtube.com/watch?v=PNwF0J3pWZY.

Many hiking itineraries (and much more including photos, videos, panoramas, terrain and via ferrata) are found on Google Earth (G.E.) Ask G.E. to go to Cortina d'Ampezzo, Belluno, Italy.

The books and websites listed above have a number of hikes described in some detail.

The Cortina Tourist Office has a nice hiking map.

There are hundreds and possibly thousands of hiking paths and trails everywhere in and around Cortina. These are well maintained and marked by number, and vary considerably in length, difficulty, vertical gain and loss, and access. It would be impossible to try to list them on this website, but they offer outstanding opportunities for attendees at every level of walking/hiking/scrambling ability. In one way or another most connect the various rifugios, and often include peaks and dramatic viewpoints.



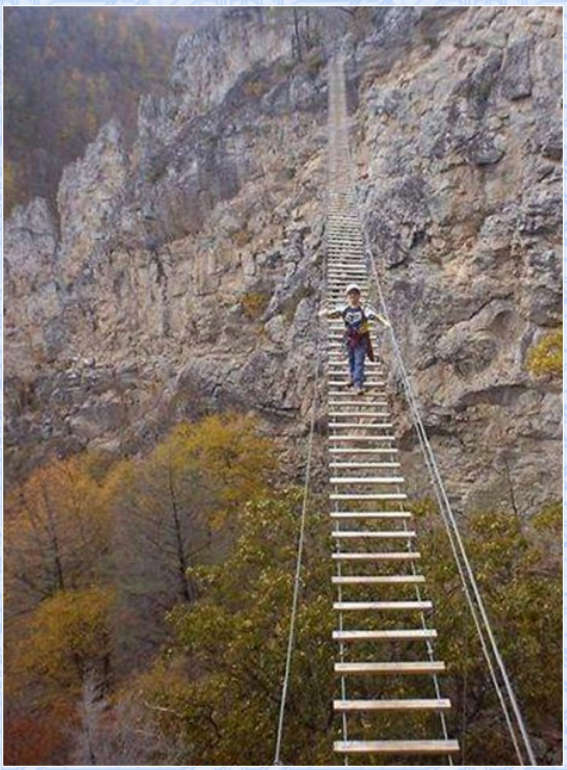
Via Ferrata

Via Ferrata are protected hiking paths in the dramatic heights, cliffs, and spires of the Dolomites. The hiker uses a harness, slings and carabiners, and uses these to attach to cables that are themselves attached to the mountain cliffsides. Many via ferrata also use ladders and bridges and some involve a bit of protected scrambling. They offer dramatic scenery and exposure normally available only to climbers but in almost perfect safety.

The via ferrata range from easy to difficult in terms of effort and exposure, and are all rated and described so the hiker can choose one that is appropriate. The books at the beginning of this section include several listing the many via ferrata including those near Cortina.

One website: http://freespace.virgin.net/paul.benham/dolo/intro.html.

Cortina area Via Ferrata:



A few possibly useful web links:

- **http://anotherheader.wordpress.com/2010/12/30/italy-cortina-d'ampezzo-and-via-ferrata-marino-bianchi/**
- **http://freespace.virgin.net/paul.benham/dolo/intro.html**
- **http://www.communitywalk.com/map/15055**

http://malamuteman.com/HikingInTheDolomiti.pdf

Via Ferrata, although by definition protected, nonetheless can vary considerably in difficulty. The usual grading is on two scales, technical difficulty that ranges from I (easiest) to 5 (most difficult), and seriousness that ranges from A (easiest) to C (most serious). There are many via ferratas in the Cortina area. Here are some with brief descriptions (extracted from Via Ferratas of the Italian Dolomites: Vol 1, pgs 187+, by Smith and Fletcher-- each VF is described in detail, most with a map). Below the three numbers indicate meters ascent, meters descent, and max altitude in meters.

The estimated average time is given last; some routes have starts and exits that are easy to reach by car or cablecar/chairlift. Others may require a fair amount of walking. Some times are for start or exit at a rifugio. Note that the start and end points sometimes can be altered by use of lifts, changing the estimated times for completion. The opportunities for passing slower parties varies considerably by route, and some of the more popular via ferrata can be slowed by traffic (if one is unwilling to detach from the cables, then passing a party ahead can be hard and the times can slow, although many parties do pass others, especially when this is a safe option). Thus the times given should not be taken too seriously, and one should carefully read the detailed route descriptions in any of the via ferrata books or other materials.

Some of these routes have sections that are simple paths, unprotected, but of course any potentially dangerous sections are protected. At some times of the year a few via ferrata have sections which may require crossing snow or ice, but this is unlikely in late July. A few have long tunnels (constructed during the wars--read the detailed descriptions) in which case a headlamp or flashlight is needed.

Experienced via ferrata users sometimes forego use of equipment on the easier routes and sections, but this is not recommended to ASIC attendees because the quality of the talks is too high to miss. Thus via ferrata walkers should use climbing harness, slings and carabiners, and helmet. In some earlier eras, some shops rented full via ferrata gear, including a full body harness, but this is almost never done today.

Here are a few of the local Via Ferrata:

Alle Cascata di Fanes nel Parco: Short and easy, but nice and goes behind the Rio Fanes waterfall. At entrance to Ampezzo Nationaql Park. 4 hrs.

Cortina West:

- **Col de Bos summit: from Falzarego/Strobel restaurant; ~4-5 hrs.**
- **Tomaselli: from Lagazuoi to the peak if Cima Fanis Sud; famous war route; 5-6 hrs**

Cortina North: (SS51 ~ 6 km north of Cortina)

- **Barbara/Dalaiti [I.A.]: 200, 200, 1400; 2 hrs**
- **Ettore Bovera - Col Rosa [3.B.]: 900, 900, 2166; 6 hrs**
- **Michielli Strobel - Punta Fiames [3.B.]: 950, 950, 2240; 5-6 hrs**
- **Terza Cengia - Forcella Zumeles [2.C.]: 650, 650, 2301' 5-6 hrs**

Cortina (Cristallo): (East of Cortina: Lifts from Rio Gere to Rif. Lorenzi)

- **Marino Bianchi - Cima di Mezzo [2.B.]: 220, 220, 3154; 3-4 hrs**
- **Ivano Dibona [2.B.]: 100; 1600; 3008; 7-8 hrs**
- **Renato de Pol - Punta Ovest del Forame [2.B.]: 1000, 1000, 2413; 6 hrs**

Cortina (Tofane): (SS48 west of Cortina, or by cablecar/lifts)

- **Giovanni Lipella - Tfane de Rozes [4.C.] 1250, 1250, 3225; 8 hrs (bring head lamp for**

tunnel)

- **Sentiero Astaldi [1.A.]: 300, 300, 2303; 2 hrs**
- **Sentiero Guiseppi Olivieri [1.B.]: 0, 500, 2800; 2 hrs**
- **Olivieri alla Punta Anna: from Rif. Dibona to the peak of Punta Anna; 5-6 hrs.**
- **Punta Anna and Gianni Aglio - Tofane de Mezzo [5.C.]: 1200, 1200, 3244; 8-9 hrs**
- **Lamon and Formenton - Tofane di Dentro [2.B.]: 200, 950, 3244; 4 hrs**

Cortina (Sorapiss): (8 km East of Cortina on SS48 to Passo Tre Croce, or lifts from Cortina to Rf. Faloria)

- **Francesco Berti [3.C.]: 800, 200, 2670; 5-5.5 hrs**
- **Sentiero Carlo Minazio [1.C.]: 200, 450, 2321; 3-4 hrs**
- **Alfonzo Vandelli [3.B.]: 310, 440, 2360; 3-4 hrs (single day 550, 550, 7-8 hrs)**

Misurina: (15 km NE on SR48 and SP49)

- **Monte Piana [1.A.] 460, 460, 2324 (~8 hrs)**
- **Delle Scalette - Torre Toblino [3.B.]: 300, 300, 2617; 5 hrs**
- **Sentiero del Curato Militare Hosp - Torre Toblino [2.A.]: 300, 300, 2617; 4.5 hrs**
- **Sentiero de Luca/Innerkofler - Monte Paterno [2.B.]: 420, 420, 2744; 5 hrs**
- **Sentiero Delle Forcella - Monte Paterno [1.B.]: 500, 500, 2744, 6 hrs**
- **Sentiero Bonacossa [1.A.]: 400, 200, 2480; 5 hrs**
- **Merlone - Cima del Cadin de NE [3.B.]: 920, 920, 2788; 5 hrs**
- **Cengia del Doge - Marmarole [1.C.]: 980, 980, 2047; 7-8 hrs**

Sesto: (44 km north SS51, 49, 52)

- **Ferrata Nord - Croda Rossa di Sesto [2.B.]: 1000, 1000, 2936; 6 hrs**
- **Strada Degli Alpini [2.B.]: 1400, 1400, 2717; 8 hrs**
- **Mario Zandonella, (+SE Variante) - Croda Rossa di Sesto [4.B.]: 1500, 1500, 2936; 8 hrs**
- **Aldo Roghel [4.C.] and Cengia Gabriella [3.C.]: ~1500, ~700 or 1700, 2540; 8-10 hrs**

Auronzo: (a lake ~35 km to the East of Cortina on SR 48)

- **Sentiero Degli Alpni - Marmorole [2.C.]: 1500, 1500, 2650; 8-9 hrs**
- **Sentiero Amalio da Pra - Marmorole [2.B.]: 550, 550, 2298; 4 hrs**
- **Mazzetta - Padola [2.C.]: 1200, 1200, 2347; 7-8 hrs**
- **Ferrata Sartor - Monte Peralba, Sappada [2.B.]: 880, 880, 2694; 4.5 hrs**
- **Nord [3.B.] and Sud Ovest [2.B.] - Monte Chiadenis, Sappada: 650, 650, 2489; 5 hrs**
- **Val Pesarina [2.B.?]: 1200, 1200, 2458; 8-10 hrs**

If one does not have the harnesses, slings, carabiners (and helmets) needed for a via ferrata they will in most cases be available from the conference guides and failing that can be rented from a number of stores in Cortina. Generally speaking anyone used to mountain hiking can manage most of the via ferrata without guides, but guides can be hired for this purpose, and can make the experience even more enjoyable, allowing choice of the best and most scenic and adventurous routes, ease of navigation, and safe instruction. We anticipate that one of the two conference climbing guides will lead a group at least once on an especially noteworthy via ferrata (we will have sign ups).

Mountain Biking and Road Biking

Cortina is well known for summer biking, both mountain biking (many lifts give access to high starting points that allow exciting descents) and road biking (many of the climbs have been used in the Tour de France). One can bring one's own bicycle, but there are shops in Cortina that will rent. There are two Cortina bike parks (bike park and skill park), shops to rent bikes, and an enormous system of bike trails of all descriptions. A bike trail map is available at the tourist office. There are far too many trails and itineraries to list on this website.

Rock Climbing

Climbing on Cinque Torri, a site to be used
in ASIC 2013 for a 'group climbing' day.

The rock climbing possibilities around Cortina are endless. The books listed on this website give descriptions and locations of many of the more famous climbs.

We always arrange at least one and usually two 'group' climbing days that allow beginners, novices, and children to try rock climbing. The sites are chosen to have many one pitch 'top rope' climbs at all levels of difficulty but especially having a good number of climbs suitable for beginners. We have climbers at all levels of ability come on these group days. Both the two conference guides and the better climbers help the beginners at the start of the day, and after a while the better climbers move on to the more difficult climbs in the same area. Time permitting the group traditionally stops for gelato on the way back to the conference.

A note on grades and a note on crowds:

- **Grades: One should not rely completely on the grades of the climbs that are listed in the various guidebooks. Some of the climbs in the Cortina area are among the most famous, most scenic, and oldest in Europe, and have been popular for 100 years. As many parties have climbed these daily in season over this long period the rock, which at first had good holds and good friction, has become quite polished and smooth. As a result certain climbs are far more difficult now than when they were first climbed, but the grades have in most cases remained unchanged. There are thousands of excellent routes, however, most of which do not suffer from this problem.**
- **Crowds: The times given in the guidebooks are appropriate for an average climbing party that is alone on a route. Some of the routes are extremely popular (especially on weekends) and a party can find itself with many parties ahead on the same route. Not only does time for a route go up with more parties due to logistics, the climbing moves at the speed of the very slowest party that is ahead. Some routes should therefore be skipped, or should be planned for a very early start, so as to be at or near the first in line.**

When planning routes it will therefore be important to discuss options with Guido Bonvicini and the other climbing guide associated with the conference.

On top of Torre Grande in Cinque Torri.
Conference guide Guido Bonvicini enjoying the day.

Mountaineering

The many peaks in the Cortina area allow a variety of mountaineering ascents, albeit the distinction between long rock climbing routes, scrambling, via ferrata, and hiking to gain these peaks sometimes gets blurred. Perhaps the main 'mountaineering' concern is time: If one attempts a high peak from a low starting elevation the extremely large vertical relief will generally entail a very long day, likely making it impossible to return in time for the conference talks. Thus this type of mountaineering, at whatever degree of technical climbing is sought, should likely be planned for days prior to or after the conference.

Canyoning

Canyoning is suitable for beginners with no experience but is an exciting and enjoyable outing. One wears a wetsuit to insure warmth, then enters a stream in a narrow canyon high in the dolomites. Then one descends the stream, by walking, scrambling, floating, and sliding, whenever conditions allow. When cliffs are encountered the guide lowers the client on a rope.

Parasailing

Parasailing, or paragliding, is a sport in which one leaves a high point in the mountains by use of a large parasail (see photo), and then sails with the wind currents high over the mountains and cliffs, until eventually descending and landing (gently) at a designated pick up spot. This activity appears to be suitable only for experts but is actually available for anyone without experience, with use of what is known as 'tandem' flying: The flight is done with an expert guide and the client on a single large parasail: The expert does the flying and the client enjoys the experience. Tandem paragliding provides an exciting and exhilarating experience and is the closest one can come to what it feels like to be a bird in flight. Paragliding in the Dolomites gives the additional benefit of extraordinary scenery.

Parks

There is an adventure park in Cortina called the 'Adrenalin Center'.

Cortina has two bike parks, one at Via Stadio 12.

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Schedule

There will be a single speaking session each day each with seven (or more) talks. These sessions will be held in a conference room at the Grand Hotel Savoia. Normal talk duration will be 30 minutes including questions and discussion. However, if there are more than 42 presenters, then some talks will be assigned

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ASIC 2013 Schedule

- **Note 1: IMPORTANT! The reception on day one starts at 15:15. All subsequent days will start with food and refreshments at 15:35. Talks every day begin at 16:00, with a 15 minute refreshment break about halfway. Dinner will begin about 20:30-20:45.**
- **Note 2: For each session the Chair is listed first and the other talks listed alphabetically by speaker's name. The Chair will strictly enforce timing, and will choose the order of speakers (presumably after consultation with the speakers).**
- **Note 3: The first day at 20:00 guides will give a brief introduction to local activities, and take questions. Activity sign-up sheets will be available. The signups and further discussion will occur again at the end of the talks on day 2.**

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Authors, Titles, Abstracts

Listing by speaker

Speaker	Allen, Colin
Author 1	Allen, Colin Indiana University Cognitive Science and History and Philosophy of Science
Title	Reconceptualizing Marr`s 3 levels
Abstract	Marr`s 3-level account of explanation in cognitive science posits a computational (functional) level, algorithmic (or process) level, and an implementational (neural or hardware) level. The textbook story is that these levels constitute a single explanation because they are unified by the same input-output relations. While textbook stories have their uses, the actual relationship between cognitive models is more complicated. I will illustrate this with an example or two drawn from the recent literature in cognitive science with the goal of

	gathering more ideas from ASIC participants about the extent to which they think the Marrian framework is outdated and should be abandoned, still useful despite its limitations, or worth refining into something that better reflects the actual practice of cognitive modelers.

Speaker	Anderson, John
Author 1	Anderson, John Carnegie Mellon
Title	Identifying the Locus of Learning in Complex Mathematical Problem Solving
Abstract	A combination of multivariate pattern analysis and hidden Markov models was applied to a fMRI with behavioral data to identify a sequence of 5 major phases that students go through in solving a type of complex mathematic problem: An Orientation phase where they identify the problem to be solved, an Encoding phase where they encode the needed information, a Computation Phase where they perform the necessary arithmetic calculations, a Transformation Phase where they perform necessary Algebraic operations, and a Response Phase where they generate the answer. Because of the problem structure and because of variability in solution strategy, these phases are broken out into 15 different states that are separated in time. States from the same phase share the same activation patterns. The duration of the Computation and Transformation phases distinguish different problem types. There are temporal and activation signatures that distinguish the trial on which participants master a particular trial type. Reflecting on the answer they have just determined, they show increased time as they output the answer in the Response Phase and they show increased activation in a number of brain areas, particularly the right rostrolateral prefrontal cortex. These results illustrate the power the HMM-MVPA approach to identify the critical events in a long problem-solving sequence.

Speaker	Annis, Jeffrey
Author 1	Annis, Jeffrey University of South Florida
Author 2	Malmberg, Kenneth University of South Florida
Title	Overcoming Sequential Dependencies in Recognition Memory
Abstract	Sequential dependencies (SDs) occur when the current response is correlated with previous responses, and have been observed in recognition memory tasks (Malmberg and Annis, 2012). Annis & Malmberg (submitted) modeled SDs in recognition memory in the

	REM framework (Shiffrin & Steyvers, 1997) by assuming that some of the features from the retrieval cue on trial n carry over to the retrieval cue on trial n + 1. The model also assumes that on each trial, there is a probability that carryover may not occur. During these trials, the retrieval cue is "refreshed," and the information from previous trials does not inform the decision on the current trial. We hypothesized that in order to refresh the retrieval cue on the current trial, attention must be shifted away from the information held in the previous retrieval cue. To test this, participants were presented with recognition memory test trials with interpolated lexical decision (LD) trials. If attention shifts away from the previous recognition test trial to complete the LD test trial, then on the subsequent recognition test trial we should observe a decrease in the magnitude of SDs. In the standard framework of Null Hypothesis Significance Testing, it is not possible to find evidence in favor of the null hypothesis. In order to overcome this limitation, a Bayesian t-test (Kruschke, 2012) was conducted. The Bayesian analyses suggest interpolating LD test trials between recognition memory test trials reduces SDs.

Speaker	Bernhardt-Walther, Dirk
Author 1	Bernhardt-Walther, Dirk Department of Psychology
Title	Scene categorization is based on structural, not textural features
Abstract	Humans can categorize complex natural scenes quickly and accurately. Which properties of scenes enable such an astonishing feat? Line drawings of natural scenes provide us with comparably easy access to these properties, while still being compatible to photographs in their neural representation of scene category (Walther et al., PNAS 2011). We extracted five sets of scene properties from line drawings of natural scenes: contour length, orientation, and curvature, and type and angle of contour junctions. We then categorized natural scenes based on the statistical distributions of these properties. Orientation was the property that allowed for the highest categorization accuracy. However, we found that the pattern of categorization errors for curvature, junction type and angle provided the best match with human behavior. Thus, junctions and curvature appear to be particularly relevant for the human ability to categorize scenes. We verified this computational prediction in a behavioral experiment with manipulated line drawings of scenes, in which the junctions were modified while preserving length, orientation and curvature. As expected, this manipulation led to a significant decrease in categorization accuracy. Our results indicate that the human ability to categorize complex natural scenes is to a large extent driven by the structure of scenes, which is described by junctions and curvature. Line orientation, which is tightly linked to the spatial frequency spectrum, is useful for computational scene categorization but does not match human

	behavior. This finding challenges the popular view that natural scene categorization relies on statistical regularities of the spatial frequency spectrum.

Speaker	Boehm, Udo
Author 1	Boehm, Udo University of Groningen
Author 2	Van Maanen, Leendert University of Amsterdam
Author 3	Forstmann, Birte University of Amsterdam
Author 4	Van Rijn, Hedderik University of Groningen
Title	Model-Based Estimates of Response-Caution Predict Single-Trial EEG Data
Abstract	Recent theories of decision-making under time constraints suggest that the pre-supplementary motor area (pre-SMA) modulates the activity of the basal ganglia to increase the activation of an emerging action plan on the cortex and thus facilitate fast but potentially faulty responses (Lo & Wang, 2006; Forstmann et al., 2008, 2010). This idea is supported by a number of fMRI studies that related response caution, the amount of evidence individuals gather before engaging in a decision, to the activity of the pre-SMA. EEG studies have linked the contingent negative variation (CNV), a well-studied slow potential, to the ease with which participants can trigger a response (Elbert, 1990). Source localisation studies have suggested that the CNV originates from brain regions in close proximity to the pre-SMA (Leuthold & Jentzsch, 2001). To test whether the CNV reflects adjustments of response caution implemented by the pre-SMA, we conducted an EEG experiment in which participants performed a random dot motion task. At the onset of each trial, participants were cued to either focus on quick or on accurate responding. We obtained estimates of participants' response caution for every trial from a version of the linear ballistic accumulation model (Brown & Heathcote, 2008) that we fit to their reaction time data. Our results show the CNV amplitude to correlate with fluctuations in response caution under speed but not under accuracy instructions, implying that the CNV reflects the pre-SMA's mediation of action planning. Moreover, our data indicate that response caution is set before participants engage in a decision task.

Speaker	Brown, Gordon
Author 1	Brown, Gordon University of Warwick

Author 2	Lewandowsky, Stephan University of Bristol and University of Western Australia
Title	Social Sampling Theory: A Model of Social Norms, Segregation, and Polarisation
Abstract	An agent-based model of social norm effects and polarisation is described. The model is cast with a utility-maximising framework. It is assumed that, when choosing an action, agents located within a social network observe the behaviour of social network neighbours and hence infer the social distribution of particular attitudes. Agents are assumed to dislike behaviours that are extreme within their neighbourhood (social extremeness aversion), and hence have a tendency to conform. However agents are assumed also to prefer choices that are consistent with their own true beliefs (authenticity preference). Behavioural choice reflects a compromise between these opposing principles. The model explains a number of social phenomena including homophily and the development of segregated neighbourhoods, polarisation, certainty and confidence effects on social conformity, and a number of other phenomena.

Speaker	Cheng, Patricia
Author 1	Cheng, Patricia UCLA
Author 2	Lijeholm, Mimi California Institute of Technology
Author 3	Sandhofer, Catherine UCLA
Title	Causal invariance in intuitive and scientific causal inference
Abstract	Scientists\' concern with objectivity has led to the dominance of associative statistics in scientific journals, with the basic concept of independence being defined on observations only. Our analysis reveals that to infer causes of a binary outcome (e.g., whether or not a tumor cell is malignant), the associative definition of independence (based on observations alone) results in a logical inconsistency -- even for data from an ideal experiment -- for both frequentist and Bayesian statistics. Removing the logical error requires defining independence on counterfactual causal events. We report experiments showing that natural causal discovery in humans adopts the coherent though more complex causal definition. Our findings together suggest that the causal definition is adaptive, and that introducing a causal statistics would result in more consistent and generalizable causal discoveries in medicine and other sciences.

Speaker	Cook, John
Author 1	Cook, John University of Queensland, University of Western Australia
Author 2	Lewandowsky, Stephan University of Western Australia
Title	The Biasing Influence of Worldview on Climate Change Attitudes and Belief Updating
Abstract	It is well established that political ideology has a strong influence on public opinion about climate change. There is also evidence of ideologically driven belief polarization, where two people receiving the same evidence update their beliefs in opposite direction. Presenting scientific evidence can result in a \"backfire effect\" where conservatives become more sceptical of climate change. It is possible to model (and hence better understand) the backfire effect using Bayesian Networks, which simulate rational belief updating using Bayes Law. In this model, trust in scientists is the driving force behind polarization and worldview is the knob that influences trust. Experimental data comparing the effectiveness of various interventions are presented and discussed in the context of the Bayesian Network model.

Speaker	Cottrell, Gary
Author 1	Cottrell, Gary UCSD
Author 2	Shan, Honghao Experian
Title	Efficient Coding: From Retina Ganglion Cells To V2 Cells
Abstract	We use a combination of our Recursive Independent Components analysis (RICA) algorithm and sparse Principal components analysis (sPCA) to provide the first model that learns in an unsupervised fashion a model of the first four visual processing layers in the brain: Center surround cells in the retina and Lateral Geniculate Nucleus (LGN), simple cells in V1, complex cells in V1, and finally, receptive fields that accord with data concerning cells in V2. In most applications of the efficient coding theory, which states roughly that cells in the visual system act to reduce the redundancy in their inputs by learning features that are independent from one another, there is a step where PCA is applied. While PCA can be thought of as a neural network, this step (and the receptive fields that are learned) is usually not reported in detail. Recent work by Vincent et al. has shown that sparse PCA applied to natural images can learn the center surround receptive fields of retina and LGN cells, and that ICA on top of this still learns the edge detectors that have been seen

	as the result of these algorithms since Bell & Sejnowski and Olshausen & Field\'s pioneering work. Our contribution is to use sparse PCA in our hierarchical ICA model, and show that sparse PCA applied to the edge detectors gives the local pooling properties seen in complex cells in V1. FInally, ICA applied to the result of this gives cells resembling V2 cells in their receptive field properties.

Speaker	Cox, Greg
Author 1	Cox, Greg Indiana University
Author 2	Lewis, Nick Indiana University
Author 3	Shiffrin, Richard Indiana University
Title	A Dynamic Model for Episodic Memory Retrieval
Abstract	We present a dynamic retrieval model: When a test stimulus is presented, its features are extracted over time, and the current set of features, plus context, are used at each moment to probe memory. Thus the response from memory changes in accord with the probe, dynamically. The model explains a variety of surprising findings in episodic recognition, including \'fluency\' (an increase in \'old\' responding due to a subliminal matching prime), coherent responding in the face of large test-to-test changes in stimuli type, and the effects caused by presenting some test item features subliminally prior to others when the earlier features vary in diagnosticity.

Speaker	Dennis, John Lawrence
Author 1	Dennis, John Lawrence University of Perugia, Perugia, Italy ǀ Catholic University of the Sacred Heart, Milan, Italy
Title	Labor and investment: A tale of a core ownership principle.
Abstract	Property ownership is enormously important in people\ \ \'s lives. Ownership influences how much we value objects (i.e., endowment effect) (Kahneman, Knetsch, & Thaler, 1990), responsibility judgments when those objects harm others or damage objects (Elkind & Dabek, 1977) how memorable those objects are (Cunningham, Turk, Macdonald, & Macrae, 2008) and our preferences, such that owned objects are preferred over similar non-owned objects (Beggan, 1992). In a series of online, iPad and lab studies with children and adult participants labor/investment influenced ownership judgments while ownership assignment

	influenced labor/investment. In one study labor/investment that \\\"caused a change\\\" in an object was associated with ownership assignment. In another study, labor/investment influenced responsibility judgments for positive/negative consequences associated with that object, while in another set of studies both ownership assignment and responsibility judgments were significantly influenced by whether that labor was in the first or third person. A set of studies reveal that labor/investment significantly influences participants judgments associated with \\\"stealing\\\" pirated materials. Another study reveals that when objects were described as being \\\"owned\\\" by participants, the labor/investment used to change the object increased and the changed object was judged as being more creative.

Speaker	Dixon, Peter
Author 1	Dixon, Peter Dept. of Psychology, Univ. of Alberta
Author 2	Bortolussi, Marisa Dept. of Modern Languages and Cultural Studies, Univ. of Alberta
Title	The Mediated Nature of Narrative Comprehension
Abstract	Accounts of narrative comprehension often neglect the importance of the narrator and memory in the mental representation of the story world. In contrast, we argue that readers generate a representation of the narrator, that is, the implied speaker of the words of the text. In turn, readers use their representation of the narrator to interpret the events of the story world and to decide what is important in the story. We will review experiments demonstrating that subtle variations in the manner in which perception and speech are presented change readers\' representation of the narrator, the interpretation of characters and events, and memory for the text.

Speaker	Donkin, Chris
Author 1	Donkin, Chris University of New South Wales
Author 2	Nosofsky, Robert Indiana University
Author 3	Shiffrin, Richard Indiana University
Author 4	Gold, Jason Indiana University

Title	Discrete-Slots Models of Visual Working-Memory Response Times
Abstract	Much recent research has aimed to establish whether visual working memory (WM) is better characterized by a limited number of discrete all-or-none slots, or by a continuous sharing of memory resources. To date, however, researchers have not considered the response-time (RT) predictions of discrete-slots vs. shared-resources models. To complement the past research in this field, we formalize a family of mixed-state, discrete-slots models for explaining choice and RTs in tasks of visual WM change detection. In the tasks under investigation, a small set of visual items is presented, followed by a test item in one of the studied positions for which a change judgment must be made. According to the models, if the studied item in that position is retained in one of the discrete slots, then a memory-based evidence-accumulation process determines the choice and the RT; if the studied item in that position is missing, then a guessing-based accumulation process operates. Observed RT distributions are therefore theorized to arise as probabilistic mixtures of the memory-based and guessing distributions. We formalize an analogous set of continuous shared-resources models. The model classes are tested on individual subjects both with qualitative contrasts and quantitative fits to RT-distribution data. The discrete-slots models provide much better qualitative and quantitative accounts of the RT and choice data than do the shared-resources models, although there is some evidence for "slots plus resources" when memory set size is very small.

Speaker	Dunn, John
Author 1	Dunn, John University of Adelaide
Author 2	Kalish, Michael University of Louisiana at Lafayette
Title	Why there can be no such thing as the face-inversion effect: The problem of nomic measurement in psychological science.
Abstract	Cueing with an inverted (rotated) stimulus leads to a decrement in memory accuracy and this decrement is greater for pictures of faces than for pictures of other mono-oriented stimuli such as houses. This is called the face-inversion effect and is of interest as it suggests that faces are perceived, represented, or processed differently from, say, houses. However, the existence of this effect rests on the implicit assumption that the relationship between memory strength and accuracy is the same for faces and houses. This illustrates a more general problem whereby constructs of interest, such as memory strength, attention, or affect, must be inferred from changes in some observable feature of human behaviour. Remarkably, this problem is not confined to psychology but affects all of science and has been called by Chang (2004), the problem of nomic measurement . I

	outline how this problem affected attempts to measure temperature by physicists over a 250 year period and draw some stern lessons for psychology consonant with earlier admonitions by Loftus (1978). I conclude that at our present level of development, there can be no such thing as a face-inversion effect or other materials-based effects, such as the picture-superiority effect, or the word-frequency mirror effect. Chang, H. (2004). Inventing temperature: Measurement and scientific progress. New York: Oxford University Press. Loftus, G. R. (1978). On interpretation of interactions. Memory & Cognition, 6(3), 312-319.

Speaker	Erkelens, Casper
Author 1	Erkelens, Casper Utrecht University
Title	The power of linear perspective in slant perception and its implication for the neural processing of orientation
Abstract	Virtual slant is defined here as the slant of a surface based on the assumption of linear perspective. Virtual slants of obliquely viewed 2D figures consisting of skewed columnar grids were computed as a function of depicted slant and slant of the picture surface. Computations were based on an assumption of parallelism. Virtual slants were compared with perceived slants in binocular viewing conditions. Perceived slant was highly correlated with virtual slant. Contributions of screen-related cues, including disparity and vergence, were negligibly small. The results imply that many past findings of both transformation and (apparent) compensation in pictorial viewing are straightforwardly explained by virtual slant. Analysis shows that slant is perceived from converging lines whose angular differences are smaller than the limits have been measured in orientation discrimination tasks. Slant perception on the basis of linear perspective implies non-local comparisons between line orientations. The power of linear perspective suggests a yet unproposed role for the elaborate network of long-range connections between the abundance of orientation detectors in the visual cortex.

Speaker	Foster, James
Author 1	Foster, James University of Colorado, Boulder
Author 2	Jones, Matt University of Colorado, Boulder
Title	Analogical Reinforcement Learning
Abstract	The goal of the present work is to develop a computational understanding of how people learn abstract concepts. Research in

	analogical reasoning suggests that higher-order cognitive functions such as abstract reasoning, far transfer, and creativity are founded on recognizing structural similarities among relational systems. However, we argue a critical element is missing from these theories, in that their operation is essentially unsupervised, merely seeking patterns that recur in the environment, rather than focusing on the ones that are predictive of reward or other important outcomes. Here we integrate theories of analogy with the computational framework of reinforcement learning (RL). We propose a computational synergy between analogy and RL, in which analogical comparison provides the RL learning algorithm with a measure of relational similarity, and RL provides feedback signals that can drive analogical learning. We formalized this integration in a model that learns to play tic-tac-toe. The model uses RL to incrementally learn value estimates of stored exemplars and schemas. These estimates are used to predict win probabilities for different game states by similarity-weighted averaging, where similarity is determined by the quality of analogical mappings. On some trials, especially useful analogies produce new schemas that are added to the pool. Initial simulation results support the power of this approach.

Speaker	Goldstone, Robert
Author 1	Braithwaite, David Indiana University
Author 2	Goldstone, Robert indiana University
Title	Example variability is beneficial if you're mathematically strong enough to take it
Abstract	When teaching a concept from multiple examples, a potent variable to manipulate is the variability of the examples. Low variability may help learners see the structural patterns held in common by the examples. High variability may help learners generalize these patterns to new examples. Some proposals have advocated increasing the variability of examples over time to capitalize on both of these advantages (Elio & Anderson, 1984; Kotovsky & Gentner, 1996). We have studied the possible moderating effect of individual differences on variability in the domain of mathematical combinatorics problems. Learners with relatively strong prior knowledge of combinatorics, as measured by self-reports or pre-test scores, benefitted from high levels of example variability more than learners with low prior knowledge. High variability also increased the abstractness, but not correctness, of learners' descriptions of the general method for solving combinatorics problems, suggesting two separable components involved in generating mathematizations: identification of structural patterns, and abstraction of those patterns

	from the details of specific examples.

Speaker	Hanson, Andrew J
Author 1	Hanson, Andrew J Indiana University
Title	Multitouching the Fourth Dimension
Abstract	We demonstrate and explain how a functional cognitive understanding of simple 4D objects can be cultivated by interactive graphics methods available on a multitouch handheld device such as an iPhone. As our prototype example, we employ the 4D analog of a rolling die, and present the results of a user study showing that navigation to a specific goal state is 50 percent faster for our new multitouch interface design compared to our best mouse/keyboard-based interface.

Speaker	Hemmer, Pernille
Author 1	Hemmer, Pernille Rutgers University
Author 2	Criss, Amy Syracuse University
Title	Evaluating Word Frequency as a Continuous Variable in Recognition Memory
Abstract	The word frequency mirror effect, higher hit rates and lower false alarm rates for low compared to high frequency words, is one of the hallmarks of recognition memory. However, this regularity of memory is limited because normative word frequency (WF) has been treated as discrete (low vs. high). We treat WF as a continuous variable and find a radically different pattern of performance. Hit rates show a clear non-monotonic U-shaped relationship. That is, hit rates are higher at both the high and low end of the frequency continuum. False alarm rates increase with increasing WF. We discuss the constraints these data place on the Retrieving Effectively from Memory (REM) model and other models of episodic memory.

Speaker	Hendrickson, Andrew
Author 1	Hendrickson, Andrew University of Adelaide
Author 2	Navarro, Daniel University of Adelaide
Author 3	Perfors, Amy

	University of Adelaide
Title	Conservatism in generalization across domains
Abstract	The degree to which individuals are more or less conservative in generalising is increasingly being used in clinical and educational assessment but the consistency of individual differences in generalisation conservatism across cognitive tasks has not been systematically assessed. In this current work, we report the results of an assessment of conservatism in generalisation across a wide array of domains. Those domains include: probability assessment of which distribution items were sampled from, generalisation of grammatical rules to new instances in a grammar learning task, categorisation of new instances in an environment with a shifting category boundary, and a probability assessment of category membership for new items in a one-dimensional category space. Conservatism in each task is quantified as a set of parameters in a cognitive model specific to that task and these assessments of conservatism in generalisation show a pattern of conservatism across individuals that was not consistent across all tasks. This suggests that a single measure of conservation of generalisation across all cognitive domains might not be appropriate. More complex structures of conservatism and domain interaction will be discussed.

Speaker	Hoffmann, Janina Anna
Author 1	Hoffmann, Janina Anna University of Basel
Author 2	Von Helversen, Bettina University of Basel
Author 3	Rieskamp, J University of Basel
Title	How episodic and working memory affect rule- and exemplar-based judgments
Abstract	Making accurate judgments, such as correctly diagnosing a patient, is an essential skill in everyday life. However, little is known about the basic cognitive skills required for accurate judgments. When making judgments, people often rely on two kinds of strategies: rule-based and exemplar-based strategies. These strategies differ in the cognitive abilities they require. Specifically, high working memory capacity may benefit rule-based judgments, whereas long-term memory may be crucial for exemplar-based judgments. To investigate this hypothesis, 279 participants performed two judgment tasks that were either best solved by a rule-based or an exemplar-based strategy. Additionally, we measured working memory capacity, episodic memory, and implicit memory with three tests. Consistent with our hypothesis structural equation modeling

	showed that working memory capacity predicted judgment accuracy in the rule-based task, whereas episodic memory predicted judgment accuracy in the exemplar-based task. Implicit memory was not related to judgment accuracy. Apparently, different memory abilities are essential for successfully adopting different judgment strategies.

Speaker	Holden, John
Author 1	Holden, John University of Cincinnati
Title	Cognitive Effects as Time Dilation
Abstract	Cognitive manipulations stretch, rather than simply shift the location of response time distributions. Understanding the basis of this shape change promises to inform cognitive theory. In the context of cognitive tasks that measure response time, distribution rescaling refers to a proportional and self-similar re-sizing of a response time distribution. Empirical response time distributions resulting from several standard cognitive manipulations are examined for evidence of distribution rescaling. One possible basis for the emergence of self-similar distributions arising from cognitive activity is the fundamental mismatch between relative biological time and absolute clock time. Chemical and biological processes govern all neurophysiological and behavioral activity. These often rate-limited neurochemical and physiological processes do not generally unfold at truly fixed time scales, but rather at variable and often proportional rates, across fractal resource networks. Thus, relative to the absolute clock time of a laboratory computer, cognitive and neurophysiological time may tend express proportional time dilation or stretching.

Speaker	Hotaling, Jared
Author 1	Hotaling, Jared Indiana University
Title	Decision Field Theory-Dynamic: A Cognitive Model of Planning On-The-Fly
Abstract	Human are often faced with complex choices involving many interrelated decisions and events. In these situations achieving one's goals usually requires planning a sequence of actions, rather than a single decision. I apply Decision Field Theory-Dynamic (DFT-D), a formal model of planning and multistage choice, to account for individuals' actions in a dynamic decision making study. DFT-D is based on the idea that people plan future choices on-the-fly, through quick, repeated mental simulations of potential future outcomes. Its mechanisms provide insight into how people collect and process

	information, and by fitting the model at the individual level we can begin to explain individual difference in these terms. DFT-D is compared to several simpler models that assume no mental simulation. I find, through model comparisons, that DFT-D provides the best account of individuals' behavior.

Speaker	Jones, Matt
Author 1	Jones, Matt University of Colorado
Author 2	Curran, Tim University of Colorado
Author 3	Mozer, Michael University of Colorado
Author 4	Wilder, Matthew University of Colorado
Title	Sequential Effects in Response Time Reveal Learning Mechanisms and Event Representations
Abstract	Binary choice tasks such as two-alternative forced choice show a complex yet consistent pattern of sequential effects, whereby responses and response times depend on the detailed pattern of prior stimuli going back at least five trials. We show this pattern is well explained by simultaneous incremental learning of two simple statistics of the trial sequence: the base rate and the repetition rate. Subtler aspects of the data that are not explained by these two mechanisms alone are explained by their interaction, via learning from joint error correction. We also find that these learning mechanisms are dissociated into stimulus and response processing, as indicated by eventrelated potentials, manipulations of stimulus discriminability, and reanalysis of past experiments that eliminated stimuli or prior responses. Thus sequential effects in these tasks appear to be driven by learning the response base rate and the stimulus repetition rate. Connections are discussed between these findings and previous research attempting to separate stimulus- and response-based sequential effects, and research using sequential effects to determine mental representations. We conclude that sequential effects offer a powerful means for uncovering representations and learning mechanisms.

Speaker	Kachergis, George
Author 1	Kachergis, George Leiden University

Author 2	De Kleijn, Roy Leiden University
Author 3	Hommel, Bernhard Leiden University
Title	Towards a Spiking Neural Model for Sequential Action Control
Abstract	Action selection, planning, and execution are continuous processes that evolve over time, responding to perceptual feedback as well as evolving top-down constraints. The Theory of Event Coding (Hommel et al., 2001) posits that actions and perceptions share a common representation with bidirectional associations between the two. Thus, in this view, not only does perception select actions (along with task context), but also actions are used to generate perceptions (i.e., intended effects). We propose a spiking neural network model that implements the Theory of Event Coding to carry out sequential action control in hierarchically structured tasks such as coffee-making. Unlike traditional neural network models, which use discrete percepts to generate discrete outputs, spiking models accept real-time input and output (e.g., Natschläger, Maass, and Markram, 2002). The internal state reflects the input and network history, and the continuous output can become more fine-tuned as further perceptual input is received (i.e., discriminating "BLood" vs. "BLack") and as the internal context evolves. Thus, this model can show a variety of context effects for sequential actions that humans show. Moreover, embedding both the perceptions and actions in time—as they are in the real world—shows that the model generalizes well to time-warped sequences, and even makes mistakes resembling human errors.

Speaker	Ketels, Shaw
Author 1	Ketels, Shaw University of Colorado at Boulder
Author 2	Healy, Alice University of Colorado at Boulder
Author 3	Bromwell, Alan University of Colorado at Boulder
Author 4	Jones, Matt University of Colorado at Boulder
Title	Training away anchoring in a centroid judgment task
Abstract	Initial impressions are lasting, and thus initial misunderstandings in classroom situations can hinder subsequent learning. In previous work we described evidence of the anchoring bias in a centroid

	judgment task involving sequentially arriving targets, varying in spatial location. In decisions based on sequentially arriving pieces of information, the anchoring bias has been suggested to lead to the primacy, or inordinate influence of the first item presented on the subsequent decision, that is almost always observed in these decisions, as well as the recency, or inordinate influence of the last item or items, that is sometimes also observed. I\'ll describe four experiments in which we attempted debaising of this anchoring. The first three experiments describe declarative and nondeclarative approaches to debiasing these anchoring effects, with results suggesting that no debiasing technique can ameliorate the strong primacy that is consistently evident in this paradigm. The fifth experiment explores the effects of articulatory suppression on the centroid judgment. Results suggest that anchoring may not be a preverbal decisional bias as was previously accepted, as articulatory suppression attenuated the primacy bias seen in every other case. Implications for education are discussed.

Speaker	Kitto, Kirsty
Author 1	Kitto, Kirsty Queensland University of Technology
Title	Towards a unified treatment of cognitive context
Abstract	How are we to model a system which responds differently to the same inputs? The context of such a system is usually to blame, changing across the two scenarios, although not in a manner that could be designated as a direct input. Such contextual behaviour plagues a wide range of fields, and many different models of it have been attempted. Problematically, these solutions are often ad hoc in nature, and almost universally require that an explicit listing of each contextual scenario be made before a model can even be constructed. As contexts generally evolve and change, such a requirement is unreasonable, and often unachievable. While it it is possible to assume that there are many different forms of contextuality, and that each field is grappling with its unique variety, it could instead be surmised that it is our fundamental modelling frameworks that have led to these problems. For example, contextual systems are difficult to separate into well defined components, and this non-separability leaves them resistant to reductive analysis. This talk will discuss recent work towards a unified treatment of contextuality, inspired from quantum theory. Examples will be drawn from recent models of conceptual combination, attitude change in a social context, and semantic memory models.

Speaker	Kouider, Sid
Author 1	Kouider, Sid Ecole Normale Supérieure & CNRS

Title	Novel approaches to nonconscious perception
Abstract	Subliminal influences exists but are usually weak when measured in laboratory contexts? Does that reflect reliance on inappropriate, non-ecological methodologies (masking, flashing). I will present two more natural approaches, relying either on gaze-contingent peripheral displays, or electrophysiological response in the sleeping brain, and revealing stronger nonconscious emotional and semantic influences.

Speaker	Love, Bradley
Author 1	Love, Bradley UCL
Author 2	Mack, Michael University of Texas at Austin
Author 3	Preston, Alison University of Texas at Austin
Title	Decoding the Brain's Algorithm for Categorization from its Neural Implementation
Abstract	Acts of cognition can be described at different levels of analysis: what behavior should characterize the act, what algorithms and representations underlie the behavior, and how the algorithms are physically realized in neural activity. Theories that bridge levels of analysis offer more complete explanations by leveraging the constraints present at each level. Despite the great potential for theoretical advances, few studies of human cognition bridge levels of analysis. For example, formal cognitive models of category decisions are known to accurately predict human decision making, but whether model algorithms and representations supporting category decisions are consistent with underlying neural implementation remains unknown. This uncertainty is largely due to the hurdle of forging links between theory and brain. Here, we tackle this critical problem by using brain response to characterize the nature of mental computations and representations that support category decisions to evaluate two dominant, and opposing, formal models of categorization. We found that brain states during category decisions were significantly more consistent with latent model representations from exemplar rather than prototype theory. Representations of individual experiences, not the abstraction of these experiences, are critical for category decision making. Holding models accountable for behavior and neural implementation provides a means for advancing more complete descriptions of the algorithms of cognition.

Speaker	McLaughlin, Anne

Author 1	McLaughlin, Anne North Carolina State University
Author 2	Sprufera, John North Carolina State University
Title	The cognition of rock climbing: a human factors analysis of the human role in accidents
Abstract	Abstract: A post-hoc analysis was performed on climbing accidents reported in Accidents in North American Mountaineering 2007, 2008, and 2009. These accident reports are often semi-structured narratives with analysis by witnesses or local experts. Only accidents during technical rock climbing were examined - ice climbing and mountaineering were excluded - resulting in a total of 73 accidents with enough information contained within to code. These were coded by two independent raters on forty-seven codes adapted from the Human Factors Accident and Classification System (HFACS; Wiegmann & Shappell, 2003). This accident analysis system was derived from Reason's (1990) “Swiss cheese” model of the accident causal chain where preconditions, unsafe acts, unsafe supervision, and organizational influences interact to allow accidents to occur. Changes were made to the original HFACS codes due to the unregulated nature of adventure sports compared to traditionally analyzed domains such as aviation (Sprufera & McLaughlin, 2012). Inter-rater reliability exceeded 95% and disagreements were rectified in meetings. In general, climbers involved in accidents tended to be experienced. Complacency of skilled climbers and willful disregard of standards were two of the most commonly coded contributions to accidents. We will discuss the most prevalent skill-based errors and the relatively high contribution of cognitive factors such as attentional overload, and decision-making under mental or physical stress compared to perceptual factors or equipment failure. Many of the injuries and fatalities were preventable, such as by wearing a helmet, but reducing accidents will require a change in the culture of the climbing community.

Speaker	McNamara, Timothy
Author 1	McNamara, Timothy Vanderbilt University
Author 2	Chen, Xiaoli Vanderbilt University
Author 3	He, Qiliang Vanderbilt University
Author 4	Fiete, Ila University of Texas
Author 5	Kelly, Jonathan

	Iowa State University
Title	Bias in Path Integration in Response to Changes in Environmental Geometry
Abstract	Effective wayfinding depends on the ability to maintain spatial orientation during locomotion. One of the ways that humans and other animals maintain spatial orientation is via path integration, which operates by integrating self-motion cues over time, providing relative information about displacement. The neural substrate of path integration in mammals may exist in grid cells, which are found in the dorsomedial entorhinal cortex (dMEC) and pre- and parasubiculum in rat. Grid cells are found in rats, mice, and bats, and signatures of grid-cell activity have been identified in humans. Grid cells have multi-peak receptive fields that form the vertices of a triangular grid spanning the environment. When a familiar environment expands or contracts, the periods of grid cells rescale in the same direction. We found that distance estimation by humans using path integration was sensitive to recent deformations of environmental geometry, and showed that patterns of error were explained by a model in which locations in the environment are represented in the brain by grid cell activity.

Speaker	Montag, Jessica
Author 1	Montag, Jessica University of Wisconsin-Madison
Author 2	MacDonald, Maryellen University of Wisconsin-Madison
Title	Production of complex sentences across development: A possible role for emerging literacy
Abstract	Experienced-based accounts of language processing emphasize the role of child-directed speech in infants and young children and the ongoing role of text exposure in adulthood, but the emergence of literacy in childhood is rarely investigated as a qualitatively distinctive event in language development. This is despite the fact that lexical and structural differences between written and spoken language are well documented. We investigate the effect of text exposure on production of complex sentences in eight and twelve year-old children and adults. Study 1 consists of corpus analyses of child-directed speech (CHILDES; MacWhinney, 2000) and child-directed literature (COCA; Davies, 2008-). We investigate the frequencies of two complex sentence types: active (The book that the woman read) and passive relative clauses (The book that was read by the woman), which convey similar messages and are thus production alternatives in Study 2. We find that spoken language has a 96:1 ratio of active to passive relatives, whereas this ratio is only 2.5:1 in written language, so an enormous amount of experience with passive relatives comes from reading. Study 2 examined 8-YO,

	12-YO, and adult (all N=30) productions of relative clauses in a picture-based production task, that elicited active and passive relative clauses. Passive use (z=2.69, p<0.01) and other features more frequent in written language increased with age. Individual differences in text exposure also predicted choice of specific constructions consistent with their frequencies in written versus spoken language. These findings suggest that literacy may play a role in language development not previously investigated.

Speaker	Munro, Paul
Author 1	Munro, Paul University of Pittsburgh
Title	A neural network architecture that learns structural analogies.
Abstract	A method for training overlapping feed-forward networks on analogous tasks is extended and analyzed. The network architecture consists of distinct input and output units for the separate tasks, and requires shared weights (not just shared nodes) in the hidden layers; thus there must be at least two layers of hidden units. The learning dynamics of simultaneous (interlaced) training of similar tasks interact at the shared connections of the networks. The output of one network in response to a stimulus to the other network can be interpreted as an analogical inference. In a similar fashion, the networks can be explicitly trained to map specific items in one domain to specifc items in the other domain. The method has been applied to spatial tasks in a simple environments and to tree structures.

Speaker	Musca, Serban
Author 1	Musca, Serban CRPCC, EA 1285, European University of Brittany, Rennes, France
Author 2	Ferrand, Ludovic LAPSCO, CNRS & Blaise Pascal University, Clermont-Ferrand, France
Title	Factors of picture naming accuracy in healthy elderly people: a model comparison approach
Abstract	Twenty French healthy elderly (age range: 69-89 years, mean=78, SD=5.75) passed a confrontation naming task using 172 of the 190 line drawings of Snodgrass and Vanderwart\'s (1980) set. A model comparison approach using logistic regression models was carried out with age, gender, sociocultural level and MMSE score as subject descriptors, and name agreement, image agreement, concept familiarity, visual complexity, imageability (all from Alario & Ferrand, 1999), objective age of acquisition (Chalard, Bonin, Méot,

	Boyer, & Fayol, 2003), printed frequency, number of phonemes, number of syllables (LEXIQUE: New, Pallier, Ferrand, & Matos, 2001), printed frequency during childhood (MANULEX: Lété, Sprenger Charolles, & Colé, 2004), frequency trajectory (Zevin & Seidenberg, 2002) and animacy as predictors that describe the items. The Bayesian Information Criterion (BIC) was used to choose the best model among the candidate models. The best model that was found included, in addition to a random subject factor, animacy, objective age of acquisition, image agreement, name agreement and number of phonemes. Naming accuracy was best for unanimated items. Naming accuracy was directly related to name agreement and image agreement, and inversely related to objective age of acquisition and number of phonemes of the target word. All the other predictors, including frequency and frequency trajectory, did not predict picture naming performance in the elderly. These results are discussed and compared to those extant in the literature on picture naming in young adults.

Speaker	Navarro, Dan
Author 1	Navarro, Dan University of Adelaide
Author 2	Vong, Wai Keen University of Adelaide
Author 3	Hendrickson, Andrew University of Adelaide
Author 4	Perfors, Amy University of Adelaide
Title	Sampling assumptions in categorization and generalization
Abstract	Inductive generalization, where people go beyond the data provided, is a basic cognitive capability, and underpins theoretical accounts of learning, categorization and decision-making. Bayesian models in particular make clear that when people acquire new data, the manner in which their generalizations change is connected to the assumptions they about how those data were generated. The literature has tended to focus on two different kinds of assumption, usually termed \"strong\" and \"weak\" sampling. In strong sampling, observed exemplars are assumed to be generated from a target category, and must necessarily belong to the generating category. In weak sampling, exemplars are generated by a process assumed to be independent of the category, and so the fact that exemplars belong to a particular category is accidental. In this talk I discuss a more general family of sampling models as they pertain to concept learning tasks involving one or more target categories, the extent to which sampling assumptions depend on prior beliefs

	versus statistical learning, and the extent to which human inductions are in fact consistent with the standard Bayesian accounts that exist in the literature.

Speaker	Neufeld, R. W. J. (Jim)
Author 1	Neufeld, R. W. J. (Jim) University of Western Ontario
Title	Monitoring Cognition-Related Treatment-Regimen Efficacy using Cognitive- and Statistical-Science Principled Measurement Technology
Abstract	Cognitive performance potentially bearing on clinical symptomatology is integrated into a mixture-model design. The mixture model\'s base distribution is stipulated by a model of latency and/or accuracy of individual task performance; mixing distributions (hyper-distributions) are those of individual differences in base-distribution parameter values. Hyper-parameters of mixing distributions differ systematically over diagnostic groups having varying symptom severity. Cognitive-performance specimens (a representative of which is denoted {*}) on the symptom-significant cognitive task repeatedly are obtained from sampled individuals over the course of treatment. As combined with the respective hyper-distributions, the probability of each performance specimen, given group membership g, is available for each of the G varyingly symptomatic groups. These values become likelihood functions [i.e., Pr({*}|g)] for Bayesian posterior estimates, comprising Pr(g|{*}). Along with their successive renderings of cognitive performance, sampled individuals separately are re-assessed with the same method (e.g., diagnostic interview) used to construct groups originally supplying the sets of hyper-parameters. Now poised for estimation during each measurement phase are the base rates, or group-wise priors Pr(g), g = 1,2, G, presently constituting the population of treated individuals. The desired Pr(g) values are those that maximize the multinomial likelihood of the diagnostic classification procedure\'s current symptom-group assignments. The methodology thus synthesizes information on cognition-related symptomatology and symptom-significant cognition, to monitor shifts in Pr(g) estimates-- thereby evaluating if the administered treatment is edging clients toward healthier functioning. Potential assets in assessing CNS-directed pharmaceuticals are noted. The methodology is numerically illustrated using memory-search probe encoding in schizophrenia.

Speaker	Oberauer, Klaus
Author 1	Oberauer, Klaus University of Zurich

Author 2	Stephan, Lewandowsky University of Bristol and University of Western Australia stephan.lewandowsky.uwa.edu.au
Title	Modeling working-memory updating
Abstract	Complex working memory tasks such as operation span, n-back, or memory-updating tasks involve retention of relevant material while minimizing interference from irrelevant material (e.g., the arithmetic equations in operation span, outdated memoranda in updating tasks). We present a measurement-modeling framework for identifying parameters of theoretical interest, including the strength of activation of relevant and irrelevant representations, and the strength of binding of (relevant and irrelevant) representations to contexts that could serve as retrieval cues. We illustrate the modeling framework with an application to a working-memory updating experiment. Participants initially encoded four words presented in four different frames. They were then presented with a series of additional words presented one by one, each in one frame. Participants were instructed that each new word replaced the previous word in its frame. After an unpredictable number of updating step, the last word in each frame was tested. People recalled each word by selecting it from a set of candidates, which comprised the last word in each frame, the next-to-last word in each frame, and four words not presented in the entire trial. To separate the contributions of removal of old words and encoding of new words to updating, each new word was preceded by a cue in the same frame. We varied the time between cue and word (available for removing the old word) and the time between word presentation and onset of the cue for the next updating step (available for encoding the word). We comparatively tested two models within the modeling framework, one assuming decay and rehearsal, the other assuming interference and removal of no-longer relevant representations. The interference-removal model proved superior in a Bayesian hierarchical model comparison.

Speaker	Palmeri, Thomas
Author 1	Palmeri, Thomas Vanderbilt
Title	Cognitive and neural models of perceptual decisions
Abstract	Stochastic accumulator models of perceptual decisions have been linked to neural activity in awake behaving non-human primates. Our recent work has used these models to account for response probabilities and response times of saccade decisions and to predict the temporal dynamics of single unit neural activity. I will describe current work that considers how to scale our current models with small numbers of accumulators predicting activity of individual neurons to models with large numbers of accumulators predicting activity observed within large ensembles of neurons. I will also

	describe current work that considers how best to quantitatively compare and evaluate predicted model dynamics with observed neural dynamics.

Speaker	Pezzulo, Giovanni
Author 1	Pezzulo, Giovanni National Research Council of Italy
Author 2	Barca, Laura National Research Council of Italy
Author 3	Lepora, Nathan University of Sheffield
Title	The costs of action within dynamic models of decision-making
Abstract	Dynamic models of decision-making such as the drift-diffusion have mainly addressed tasks where the motor aspects are simple (e.g., selecting between two buttons to press). We recently performed a series of experiments (e.g., lexical decisions, perceptual discriminations) using a slightly more complex set-up (e.g., buttons are 40-50 centimeters far from the subject and have to be reached and pressed with a mouse, within a deadline). Using this experimental set-up we observe that decisions are not completed before starting the action; rather, subjects start moving very soon and often revise their decision before pressing a button. Uncertainty in the decision is often reflected in the movement trajectories. We propose a formalization of decision-making in which the costs of action (e.g., reaching and pressing a button with a mouse) are considered as proper parts of the decision to be optimized. The choice balances between the benefits of doing the right choice (i.e., pressing the right button) and its costs (e.g., time and biomechanic costs). In this framework, accumulated evidence can be used for motor preparation and to start the action before decision is completed, so as to minimize the risk of missing the deadline and the biomechanic costs of executing abrupt movements. Furthermore, the currently executed movements influence the choice, because when an action is initiated the costs of \'changing mind\' depend on the motor costs to change trajectory.

Speaker	Ratcliff, Roger
Author 1	Ratcliff, Roger osu
Author 2	Mckoon, Gail osu

Title	Individual Differences in Speed and Accuracy
Abstract	We examined individual differences in a number of numerosity experiments and found that accuracy and RT were not significantly correlated with each other. It might have been expected that faster subjects would be more accurate subjects, but this was not the case. (Although within an experiment, accuracy was negatively correlation with RT such that easier conditions had more accurate and faster RTs.) We show how a diffusion model analysis assigns individual differences to model parameters: Accuracy is largely governed by drift rate (the quality of the information on which a decision is based) and speed is largely governed by boundary settings (speed/accuracy criteria) and the time taken by nondecision processes. In a further experiment, speed instructions were used in an attempt to equate boundary settings across individuals. We conclude with analyses of other experiments using different age groups and speed-accuracy manipulations that demonstrate the generality of the experimental results.

Speaker	Rouder, Jeffrey
Author 1	Rouder, Jeffrey University of Missouri
Title	A note on the affordances of ROC analysis
Abstract	Analysis of ROC plots remains important in understanding latent processing in memory, perception, and attention. Most psychologists learn a \"standard story\" for interpreting these plots in which the curvature and asymmetry of a single isosensitivity curve are the target of analysis. For example, most psychologist believe that discrete-state models predict straight-line curves, and that asymmetry in curves licenses the possibility of two mnemonic processes. In this talk I show that this standard story is based on tenuous assumptions that have no psychological content. For instance, the straight-line prediction is predicated on a detection state that leads with certainty to the correct response. Without this assumption, isosensitivity curves from discrete-state models may not be straight lines. Likewise, all signal detection model predictions are predicated on parametric assumptions, say that latent strength is distributed as a normal. I show that rather than focusing on shape and symmetry of individual curves, the important constraint in ROCs is in the relationships among several curves, such as among a family that result when the strength of the signal is manipulated. I introduce two new formal constraints on the relationship among curves. One, termed discrete-state representability, must hold if processing is mediated by discrete state. The other, termed shift-representability, is a good benchmark for latent strength theories. I show that recognition memory and perceptual identification of briefly flashed words yields response data that are better characterized by discrete states while the detection of orientation of

	gabor patches is better characterized by a latent strength account.

Speaker	Scheibehenne, Benjamin
Author 1	Scheibehenne, Benjamin University of Basel
Author 2	Pachur, Thorsten Max Planck Institute for Human Development
Title	Cognitive Models of Choice: (When) Do Hierarchical Bayesian Estimates Pay Off?
Abstract	Parameters of cognitive models are often used to study, measure, and describe meaningful individual differences and to gain insight into underlying cognitive processes. Using individually fitted parameters relies on the assumption that the parameter values estimated for a person remain relatively invariant across time Using two prominent models of risky decision making—cumulative prospect theory (CPT, Tversky & Kahneman, 1992) and the transfer-of-attention-exchange model (TAX; Birnbaum & Chavez, 1997)—we compare the use of Bayesian hierarchical versus independent, non-hierarchical estimation techniques for assessing two aspects of model generalizability: parameter consistency and predictive accuracy. Results indicate that hierarchical techniques did not improve parameter stability measured as test-retest correlations and yield a decrease in posterior predictive accuracy. Further analyses suggest that this is because the shrinkage induced by hierarchical estimation over-corrected for extreme yet reliable parameter values on the individual level. Further analyses indicated that in the case on hand, hierarchical techniques were only advantageous in particular conditions, for example when data on the individual level was limited.

Speaker	Shiffrin, Richard
Author 1	Johns, Brendan Indiana University
Author 2	Shiffrin, Richard Indiana University
Title	Orthographic and Semantic Visual Priming
Abstract	Eight non-diagnostic subliminal or visible word primes appeared in a 3x3 grid, followed by a central word briefly flashed and masked, followed by target and foil choices. The primes were related semantically, orthographically (or both) to the target choice, the foil choice, or both. Semantic primes were chosen from Deese-Roediger-McDermott lists; orthographic primes overlapped in letters and

	position. In some conditions, one choice was related semantically to four primes, and the other orthographically to four other primes. The results were similar for semantic and orthographic priming: Brief masked primes produced a bias to choose the related item, and improved perceptual processing. Visible primes added enough noise to the decision process, and/or reduced perceptual processing enough, to harm performance (even with both-priming). In addition, long primes produced discounting, reducing the tendency to select the primed choice. We report a model for the findings.

Speaker	Sikstrom, Sverker
Author 1	Sikstrom, Sverker Department of psychology
Author 2	Hellman, Johan Department of psychology
Title	The Generalized Signal Detection Theory
Abstract	Signal detection theory (SDT) and the Dual Process SDT (Yonelinas, 2001) are the most influential theoretical frameworks for quantifying the underlying familiarity distributions. However, neither provides a detailed account for the basic finding that the old item distributions have larger variability than the new item distribution, a phenomenon that has been accounted for by the idea of encoding variability (Wixted, 2007) or an additional retrieval process (Yonelinas, 2001). We present the Generalized Signal Detection Theory (the GSDT) where the familiarity distribution is a sum of signals that passes though a sigmoidal non-linear activation function. This theory suggests that the underlying distributions can be described by a binomial density function. The GSDT accounts for the larger variability of the old distribution when the non-linarites are emphasized, but is a special case of the standard SDT when the non-linarites are attenuated. A gain-parameter determines the slope of the non-linear activation function, and the resulting new to old item variability is estimated with the slope of the z-ROC. Because the gain-parameter previously has been shown to reflect changes in catecholaminergic states (Servan-Schreiber et al., 1998), the GSDT predicted that changes in attention would result in changes in z-slope. We tested the prediction on attentive and inattentive participants, and found a difference in z-slope as a result of difference in attentional performance. The slope of the z-ROC can be related to neural encoding density, as it is directly related to the number of active nodes used for representing new and old stimulus.

Speaker	Sloutsky, Vladimir
Author 1	Sloutsky, Vladimir Ohio State University

Title	Language and Cognition: The Role of Category Labels in Categorization and Induction
Abstract	How do words affect generalization, and how do these effects change during development? One theory posits that even early in development, linguistic labels function as category markers and thus are different from the features of the stimuli they represent. Another theory holds that early in development, labels are akin to other features, but that they may become category markers in the course of development. We addressed this issue in experiments with infants, 4- to 5-year-olds and adults. In these experiments, participants learned categories and associated labels. They were then presented with a test, in which the category label was pitted against a highly salient feature. Results indicated that infants and children relied on the salient feature when performing induction, whereas adults relied on the category label. These results suggest that early in development, labels are features of items, but that they may become category markers in the course of development.

Speaker	Sperling, George
Author 1	Sperling, George University of California, Irvine
Author 2	Sun, Peng University of California, Irvine
Author 3	Wright, Charles E. University of California, Irvine
Author 4	Chubb, Charles University of California, Irvine
Title	Using centroid judgments to measure attention filters
Abstract	Subjects use a mouse to position a pointer at the centroid--the center of gravity--of a briefly displayed cloud of dots. They receive precise feedback. Trained subjects judge the centroid of 2,4,8, or 16 dots as accurately as the position of single dot. In attention experiments, a subset of dots in a large dot cloud is distinguished by some characteristic, such as a different color, and subjects judge the centroid of only the distinguished subset, e.g., dots of a particular color. The analysis computes the precise contribution to the centroid of every color relative to the target color, i.e., the attention filter for that particular color and thereby the selectivity of attention for that feature in that context. A further computation of the minimum number of dots the subject must extract from the display in order to achieve the observed accuracy gives the \"efficiency\" of the attention filter. The procedure itself is efficient, yielding an accurate

	attention filter in a single session. Measured attention filters for selecting dots of one color from a mixture of isoluminant colors are remarkably precise. Filters for selecting dots of a particular gray level or saturation from among similarly colored dots of different saturations are less precise. As time permits, results will be shown for attention filters that select for combinations of colors, for lines of a particular slant, for dots in particular depth planes, and for various other features and combinations thereof in quest of a general theory of attention to features.

Speaker	Teale, Julia
Author 1	Teale, Julia University of St Andrews
Author 2	MacLeod, Malcolm University of St Andrews
Title	Do older people suffer from an inhibitory deficit during retrieval?
Abstract	An inhibitory control deficit has been suggested as a major contributor to general age-related memory decline in older people. The basic idea is that, as we grow older, we are less able to deal with interfering information which, in turn, affects our ability to selectively retrieve target memories. Recent research in this field has produced mixed results. Using different modified versions of the retrieval practice paradigm as a measure of memory inhibition, the present studies set out to determine whether the forgetting effects typically observed under standard retrieval practice conditions might have more to do with non-inhibitory mechanisms rather than inhibition per se. Retrieval-induced forgetting emerged for both younger adults (mean age 20 years) and older adults (mean age 70 years), indicating that age-related deficits in memory are unlikely to be a function of any loss in inhibitory control. Older adults, however, reported twice as many covert intrusions as young adults on a post-experimental questionnaire, suggesting that covert cuing may also be partly driving the retrieval induced forgetting effect in older adults.

Speaker	Trueblood, Jennifer
Author 1	Trueblood, Jennifer University of California, Irvine
Title	Modeling Reference-dependent Preference Reversals
Abstract	Numerous studies have demonstrated that preferences among options in riskless choice are often influenced by reference points. That is, an existing reference level or status quo can bias preferences towards new alternatives. Reference-dependent effects have

	typically been attributed to loss aversion (Tversky & Kahneman, 1991). This research provides new experimental evidence that three standard reference-dependent effects arise in a low-level perceptual decision task with nonhedonic stimuli. This casts doubt on explanations such as loss aversion, which are limited to high-level decisions with hedonic stimuli, and indicates that reference-dependent effects may be amenable to a general explanation at the level of the basic decision process. As an alternative to loss aversion, a dynamic model of preference called the multi-attribute linear ballistic accumulator model is presented. The model accounts for the three reference-dependent effects and makes new predictions about the influence of time pressure on the effects, which are confirmed experimentally.

Speaker	Turner, Brandon
Author 1	Turner, Brandon Stanford University
Author 2	Van Maanen, Leendert University of Amsterdam
Author 3	Forstmann, Birte University of Amsterdam
Title	A Mechanistic Account of the Default Mode Network
Abstract	Spontaneous activity of the default mode network (DMN) has serious implications for trial-to-trial performance within a task. Previous examinations of the DMN have focused on relating brain activation patterns directly to behavioral measures such as accuracy or response time, aggregating across many trials. In this article, we use a flexible Bayesian framework for combining neural and cognitive models to form the Neural Drift Diffusion Model (NDDM). We fit the model to experimental data consisting of a speed-accuracy manipulation on a random dot motion task, where the stimulus on every trial is uniquely difficult. We use a hierarchical version of our model to map single-trial brain activity onto the cognitive mechanisms assumed by our model. By combining accuracy, response time, and the blood oxygenated level dependency response into a single, unified model, the link between cognitive abstraction and neurophysiology can be better understood. We use our cognitive modeling approach to show how pre-stimulus brain activity -- specifically, activity within the DMN -- can be used to simultaneously predict response accuracy and response time. Furthermore, we provide a mechanistic explanation for how activity in a brain region affects the dynamics of the underlying decision process.

Speaker	Usher, Marius
Author 1	Bronfman, Zohar Tel-Aviv University
Author 2	Brezis, Noam Tel-Aviv University
Author 3	Usher, Marius Tel-Aviv University
Title	Can we distinguish Phenomenal from Access Consciousness within a Sperling paradigm?
Abstract	The distinction between two types of conscious awareness, access vs phenomenal is a topic of intensive debate. According to one view, the visual experience is rich and it overflows the capacity of the attentional and working-memory system. On the other view this richness is an illusion that is caused by a sparse representation of the scene, with only the attended items popping into rich phenomenlogy whenever the attentional spotlight hits them. To examine this issue we use a variant of the Sperling paradigm in which, while observers usually can report 3-4 items, they also report that they saw more than that. To test this introspection we presented observers with an array of colored letters, with one row (random from trial to trial) pre-cued, which needs to be remembered for recall. After the letter-recall the participants were asked to report the color diversity of either the cued-row or the rest of the display. The color of the letters was manipulated so as to correspond to high or low color-diversity, and this variable was manipulated independently for the cued-row and the rest of the display. The results indicate that people can access about 3 letters for recall in all the conditions and that they can report simultaneously the color diversity of both the cued-row or of the rest-of the array. Moreover the accuracy for the color diversity of the cued-row increased (decreased) when the rest of the array had consistent (inconsistent) color diversity. These results suggest that color diversity -- a phenomenal content -- is registered automatically across the array without the resources of the attentional spotlight and of the working memory.

Speaker	van Fraassen, Bas
Author 1	Van Fraassen, Bas SAN FRANCISCO STATE UNIVERSITY
Title	Updating Probability: Tracking Statistics as a Criterion
Abstract	. If opinion is represented by an assignment of probabilities to propositions, the criterion proposed is that the assignment should match a possible assignment of proportions in a population. This criterion implies limitations on policies for updating in response to a

	wide range of types of new input. Satisfying the criterion is shown equivalent to the principle that the prior must be a convex combination of the possible posteriors. It is conjectured that this is equivalent to the requirement that prior expectation values must fall in the range spanned by possible posterior expectation values. The criterion is liberal; it allows for but does not require a policy such as Bayesian Conditionalization. It is offered as a general constraint on policies for managing opinion over time. We note that the much discussed policy of updating by maximizing relative entropy yields cases that violate the criterion.

Speaker	van Ravenzwaaij, Don
Author 1	Van Ravenzwaaij, Don University of New South Wales
Author 2	Boekel, Wouter University of Amsterdam
Author 3	Forstmann, Birte University of Amsterdam
Author 4	Ratcliff, Roger Ohio State University
Author 5	Wagenmakers, Eric-Jan University of Amsterdam
Title	Action Video Games Do Not Improve the Speed of Information Processing in Simple Perceptual Tasks
Abstract	Previous research suggests that playing action video games improves performance on sensory, perceptual, and attentional tasks. For instance, Green, Pouget, and Bavelier (2010) used the diffusion model to decompose data from a motion detection task and estimated the contribution of several underlying psychological processes. Their analysis indicated that playing action video games leads to faster information processing, reduced response caution, and no difference in motor responding. Because perceptual learning is generally thought to be highly context-specific, this transfer from gaming is surprising and warrants replication in a large-scale training study. We conducted two experiments in which participants practiced either an action video game or a cognitive game in five separate, supervised sessions. Prior to each session and following the last session, participants performed a perceptual discrimination task. In our second experiment we included a third condition in which no video games were played at all. Behavioral data and diffusion model parameters showed similar practice effects for the action gamers, the cognitive gamers, and the non-gamers and suggest that, in contrast to earlier reports, playing action video games does not improve the speed of information processing in simple perceptual tasks.

Speaker	Vandekerckhove, Joachim
Author 1	Vandekerckhove, Joachim University of California, Irvine
Title	Cognitive latent variable models
Abstract	We introduce cognitive latent variable models, a broad category of formal models that can be used to aggregate information regarding cognitive parameters across participants and tasks. Latent structures are borrowed from a vast literature in the field of psychometrics, and robust cognitive process models can be drawn from the cognitive science literature. The new modeling approach allows model fitting with smaller numbers of trials per task if there are multiple participants, and is ideally suited for uncovering correlations between latent task abilities as they are expressed in experimental paradigms. Example applications deal with the structure of cognitive abilities underlying a perceptual task, and executive functioning.

Speaker	Wagenmakers, Eric-Jan
Author 1	Wagenmakers, Eric-Jan University of Amsterdam
Title	A Bayesian Perspective on Replication Research
Abstract	Here I outline a three-step paradigm for replication research. In the first step, the intended analyses are preregistered, allowing one to discriminate between exploratory and confirmatory tests. In the second step, evidence is monitored using one or more Bayes factors. In the third step, a sensitivity analysis inspects the robustness of the conclusions to changes in the statistical model. I illustrate the paradigm with recent replication attempts, including the effect of clipboard weight on the assessment of a job candidate, the effect of rotating paper towels on openness to experience, and the effect of horizontal eye-movements on memory.

Speaker	Weidemann, Christoph
Author 1	Jacobs, Joshua Drexel University
Author 2	Weidemann, Christoph Swansea University
Author 3	Kahana, Michael University of Pennsylvania
Title	Direct recordings of grid-like neuronal activity in human spatial navigation

Abstract	Abstract Grid cells in the entorhinal cortex appear to represent spatial location via a triangular coordinate system. Such cells, which have been identified in rats, bats, and monkeys, are believed to support a wide range of spatial behaviors. By recording neuronal activity from neurosurgical patients performing a virtual-navigation task we identified cells exhibiting grid-like spiking patterns in the human brain, suggesting that humans and simpler animals rely on homologous spatial-coding schemes.

Speaker	Willits, Jon
Author 1	Willits, Jon Indiana University
Title	Associative Learning Processes CAN learn abstract, rule-based knowledge
Abstract	A criticism of associative models is that they are incapable of learning and representing abstract rules (Bever, Fodor, Garrett, 1968). I will present evidence that this criticism is incorrect, for classes of associative models that posit internal, mediating variables. I will make this argument using two simulations with recurrent neural networks (RNNs), testing their ability to learn two classic types of rule-based structures. In Simulation 1, I present an RNN that learns non-adjacent sequential dependencies, and learns to transfer knowledge of those dependencies to distances on which the model has not been trained. This ability to learn distance-invariant representations of sequential structure is critical for representing knowledge of events, language, and motor plans. In Simulation 2, I present an RNN that learns abstract grammars (such as whether items in a sequence are following ABA, AAB, or ABB repetition patterns), and then transfers knowledge of the grammar to novel stimuli. It has been argued that associative models are fundamentally incapable of learning this kind of knowledge (Marcus, 1999). I will explain why RNNs succeed, and argue that the nature of this learning provides evidence that, as a general rule, learning rule-like representations will not be difficult for associative models with mediating variables. I will then discuss how this argument applies to some other mediated associative models, such as statistical models using latent variables like Latent Semantic Analysis (Landauer & Dumais, 1997) and Probabilistic Topics Models (Griffiths etal., 2007), as well as Hull\'s behavioristic learning theory.

Speaker	Zednik, Carlos
Author 1	Zednik, Carlos University of Osnabrueck
Title	The role of rational analysis in cognitive scientific explanation

Abstract	What role does Rational Analysis play in cognitive scientific explanation? Although it is often characterized as a form of computational-level analysis to be contrasted with algorithmic-level and implementation-level analysis, this characterization is only partially helpful: it remains largely unclear how the computational level informs and constrains lower levels of analysis. The philosophical framework of mechanistic explanation can be used to clarify this issue. As I will argue in my talk, Rational Analysis often plays a heuristic role in the development of algorithm-level mechanism-sketches, as well as a justificatory role when selecting from competing implementation-level accounts.

Speaker	Zhang, Shunan
Author 1	Zhang, Shunan UCSD
Author 2	Yu, Angela UCSD
Title	Forgetful Bayes and myopic planning: Human learning and decision-making in a bandit setting
Abstract	How people achieve long-term goals in an imperfectly known environment, via repeated tries and noisy outcomes, is an important problem in cognitive science. There are two inter-related questions: how humans represent information, both what has been learned and what can still be learned, and how they choose actions, in particular how they negotiate the tension between exploration and exploitation. In this work, we examine human behavioral data in a multi-armed bandit setting, in which the subject choose one of four ``arms\'\' to pull on each trial and receives a binary outcome (win/lose). We compare human behavior to a variety of models that vary in their representational and computational complexity. Our result shows that subjects\' choices, on a trial-to-trial basis, are best captured by a \"forgetful\" Bayesian iterative learning model (Yu and Cohen, 2009) in combination with a partially myopic decision policy known as Knowledge Gradient (Frazier et al. 2008). This model accounts for subjects\' trial-by-trial choice better than a number of other previously proposed models, including optimal Bayesian learning and risk minimization, e-greedy and win-stay-lose-shift. It has the added benefit of being closest in performance to the optimal Bayesian model than all the other heuristic models that have the same computational complexity (all are significantly less complex than the optimal model). These results constitute an advancement in the theoretical understanding of how humans negotiate the tension between exploration and exploitation in a noisy, imperfectly known environment.

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