ASIC 2018

Seventeenth Annual Summer Interdisciplinary Conference

Loano2 Village
Italian Riviera, Italy
June 17, Sunday-June 22, Friday 2018

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Gallinara Island near Loano

Typical rock climbing near Final Ligure, not far from Loano, Italy

Announcing ASIC 2018

The Seventeenth Annual Summer Interdisciplinary Conference (ASIC 2018) will be held at Loano2 Village near Loano on the Italian Riviera, on each of the six consecutive days, June 17 –22, 2018.

The dates are chosen to reduce possible conflicts with the Cognitive Science Society meetings to be held July 25 –28 in Madison Wisconsin, and the Mathematical Psychology Meetings to be held in Madison just prior to those days.

Pools at Loano2 Village

If you have a 5% or higher chance of attending, go to the link on this website 'Potential Attendees' and list yourself, your probability, and your email.

Loano2 Village {see http://www.loano2village.it/en} is highly rated and has excellent facilities and food. The meetings, catered breaks, and buffet breakfasts and dinners will be held in the resort.

Loano2 Village is just a few kilometers inland and uphill from many white sand beaches. There are many water activities available in the area. Mountains rise from the beaches to about 3000-4000 feet, all along the Italian Riviera, offering convenient access to such activities as hiking, rock climbing, biking and mountain biking, and canyoning. There are also many attractive villages and towns along the coast.

Typical Beach on the Italian Riviera-Varigotti

Travel to the resort is quite easy, by bus, train, and auto. There are nearby airports at Genoa (80 km), Nice (110 km) and Turin (160 km), but most international attendees will find it most convenient to fly to Milan (200 km), about 2.25 hours distant by auto. By auto from Loano2 Village it does not take long (up to 90 minutes) to reach the eastern Italian Riviera (e.g. Portofino) or the French Rivera (e.g. Nice or Monaco-Montecarlo). There are many attractive villages and towns all along the coast.

Portofino (110 km)

Monaco-Montecarlo (108 km)

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

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

The subject matter of the ASIC conferences is interdisciplinary, but with a primary emphasis upon a wide variety of scientific domains within the broad frame of Cognitive Science. ASIC uses the very successful format of previous ASIC and AIC conferences: Days are free for leisure activities and discussions among participants. The talks are in the later afternoon/early evening, followed by dinner. The date has been chosen to make it convenient for attendees to bring family/friends.

Previous Years' Websites

For examples of websites for other ASIC conferences, visit ASIC 2017, ASIC 2016, ASIC 2015, ASIC 2014, ASIC 2013, ASIC 2012, ASIC 2011, ASIC 2010, ASIC 2009, ASIC 2008, ASIC 2007, ASIC 2006 and ASIC 2005. These websites generally list speakers, titles and abstracts.

Invitation

The conference is open to all interested parties, and their family and friends. 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. It will be of particular interest to scholars who fit the very general theme of the conference. We encourage you to send the conference information to friends and colleagues.

Conference Aims

The conference will cover a wide range of subjects, with a particular but not exclusive focus on topics in cognitive science, including:

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

- **philosophy of mind, cognitive science**

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

Conference Format

There is a single speaking session each day (no posters), intentionally organized to maximize the dissimilarity of each day's presentations. If the number of participants exceeds the number of speaking slots (about 42), then the organizer will select some talks to be of shorter duration, and if necessary choose the speakers that will have the opportunity to present their work./

When ready to propose a talk for ASIC, submit the information on the page on this website titled "Talk Submissions". Your will be asked to submit authors, titles, abstracts, and your entire presentation. Email the organizer for the code to add this information (it will be the same code used to make lodging reservations). This information can be edited, deleted, or altered at any time, subject to the following: authors, titles and abstracts must be posted two weeks before the conference, and the presentation must be posted by the conference start.

Registration

You are not officially on the request list for presenting research until you register and send the registration fee. Registration will be open on September 1, 2016. At that time or after, visit the Registration page on this website.

Lodging

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

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Registration Information for ASIC 2018

If you have a 5% or greater chance of attending ASIC 2018, please list yourself on the website at the link 'Potential Attendees". If you reach the point where you are reasonably sure of attending, please fill out the registration form and submit your registration fee. This fee pays for rental of the conference room, conference equipment rentals, catering costs for snacks and drinks at conference breaks and receptions, and several other miscellaneous costs.

Registration fee schedule, in US dollars:

	To Indiana Conference Bureau
Prior to January 1, 2018	$300
January 1, 2018 - March 1, 2018	$360
After March 1, 2018	$420

In addition to the registration fee per person, you may purchase additional guest vouchers for other persons attending the receptions, breaks, and dinners. The fee for guest attendance at breaks only is $15 per day. The fee for each person not at the hotel who wishes to join the buffet dinner there is 35 or 40 euros depending on day, and 25 for children staying elsewhere. These charges are to be paid directly to the hotel. NOTE If you have no guests, leave the number of guests slot blank rather than enter 'zero'.

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 May 17 the registration fee will be refunded minus a $25 handling fee. After May 17 and prior to the conference, a refund will still be made, but the handling fee will rise to $50.

Canyoning on the Italian Riviera

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Travel to Loano2 Village
Loano, Italian Riviera, Italy

HOW TO REACH LOANO AND LOANO2 VILLAGE

Travel to the resort is quite easy, by bus, train, and auto. There are nearby airports at Genoa (80 km), Nice (110 km) and Turin (160 km), but most international attendees will find it most convenient to fly to Milan (200 km), about 2.25 hours distant by auto. Trains to Loano are available at the major airports and various bus services are also available. Information on travel may be found on the hotel website.

There is ample parking at Loano2 Village. Once at the Village many sites on the Italian Riviera are easy to reach. For example, by auto from Loano2 Village it takes about 90 minutes to reach the eastern Italian Riviera (e.g. Portofino) or the French Rivera (e.g. Nice or Monaco-Montecarlo). There are many attractive villages and towns all along the coast.

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Lodging

We have placed a hold on rooms sufficient for our conference needs at Loano2 Village near Loano on the western Italian Riviera. This is an excellent hotel with good restaurants. The hotel website is at: http://www.loano2village.it/

LODGING RATES

Lodging rates given below include breakfast and dinner (see 'Meals and Breaks' on this website). Lodging reservations should be made early starting in the fall of 2017.

- **One person:**
  - **110 Euro day**
- **Two persons in one room:**
  - **160 Euro/day**

These rates are for lodging in what the resort terms 'junior rooms'.

Three or four people are lodged in what the resort terms "family classic rooms". Each adult is charged 90 euro/day; children 2-11 are charged 36 euro/day; children 12-16 are charged 54 euro/day.

CONFERENCE ROOMS:

The hotel has about four or five well equipped conference rooms of various sizes, and will provide one sufficient for our needs (seats at tables, and space for the refreshments and food at the breaks).

PARKING AND INTERNET:

There is free and ample parking, and free internet throughout.

RESERVATIONS:

To obtain the conference rates, email the organizer to obtain the conference code. Reservations can be made by email or telephone.

Telephone: +39 019.67911
Email:

DEPOSITS AND CANCELLATION POLICY:

Reservations will be made and held with a credit card and a code available from the organizer.

No charges for deposit will be taken until Feb 1, 2017, and cancellations will be free of charge if made prior to Feb. 1.

Reservations made after Feb 1 and prior to April 17 require a 20% deposit. Prior reservations will be assessed this deposit on Feb 1.

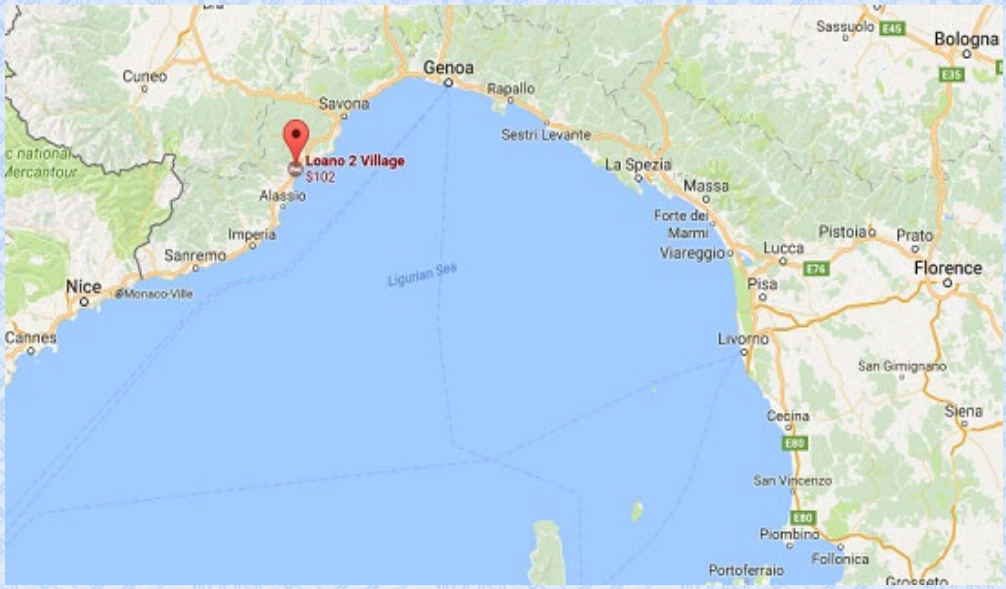
Cancellations after Feb 1 and prior to April 17 can be made free of charge except for a 10 Euro handling fee.

Reservations after April 17 will require a 50% deposit; prior reservations will be assessed this deposit on this date.

Cancellations may be made from April 17 to June 1 and the deposit refunded minus 10%. After June 1 payment in full is required and cancellation until June 16 will be allowed at a penalty of 50% of the total.

LOCATION:

Loano2 Village is on the western Italian Riviera, about 1.3 km from the center of the town of Loano, and about 1.5 km from the railway station (where there are taxis). Most attendees will probably drive: Driving directions are given on the hotel website.



The nearest airports are at Genoa ~80 km) and Cote d'Azur (~125 km). Many international attendees will use Milan (two airports; ~ 250 km, and about 2.5 hrs driving). Train service is obtainable from all airports—the destination should be Loano. Bus service is also available, but information about that is not yet available.

BEACHES AND POOLS

The hotel has large and attractive pools. There are also a variety of white sand beaches starting about ten minutes from the hotel. A few beaches are public but most (and the closest) are private and require a daily fee. The hotel has a shuttle service to the closest beaches.

SCHEDULE AND MEALS:

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

'Meals and Breaks' on this website).

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Meals/Dining/Breaks

A generous breakfast buffet is included in the daily lodging price; breakfast is available from 7:30-10:00 daily.

Multi-course buffet dinners with vegetarian and vegan choices will be available in the hotel restaurants when the sessions end, starting about 20:15-20:30.

Attendees staying elsewhere may join the main group for dinner at a charge of 35-40 euros (depending on day) and children staying elsewhere may join for 25 euros.

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Activities

There are numerous activities close to Loano2 Village, and easily reached along the Italian Riviera, including many water and beach activities, rock climbing both along the coast and at two very large sites with thousands of equipped routes (Finale Ligure and Val Pennavaire), road and mountain biking, canyoning, hiking and trekking, and much more.

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Format / Schedule

There will be a single speaking session each day each with seven (or more) talks. There are no posters. These sessions will be held in a conference room at Loano2 Village. 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 shorter time limits.

Information on submitting proposals for presentations is on the page of this website labeled "Talk Submissions"

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To be announced later

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Submissions of Talks and Posters

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

Please go to the submission form

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

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

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Contact Information:

Conference Organizer

Rich Shiffrin
Indiana University - Bloomington

Tel:
Fax:

Richard and Alissa Shiffrin hanging out in Sardinia

Email preferred but if necessary address correspondence to:

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

Webmaster/Conference Coordinator

Please direct questions concerning the website to the webmaster(s):

Ruth Eberle
Phone: (812)

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Authors, Titles, Abstracts, Presentations

Listing by speaker

Instructions:

In order to place your authors, title, abstract, and presentation slides and information on the website, email the organizer for a code (the same code used to make hotel reservations). Use this code to add, edit, or delete the information on this page. Note that the information can be changed at will.

To speak at the conference you must have authors, title, abstract on this page, at least two weeks prior to the conference (so I can arrange sessions).

This year ASIC will have a new feature: In order to talk you must add to this page your presentation slides and information in pdf format, and this must be on the website prior to the start of the conference. I want these to be self explanatory, so wherever necessary add extra text slides between your display slides more or less stating what you would say during your presentation. You may decide not to show those text slides when you give your presentation, but they should be on the website so attendees can access and peruse them. These talks will appear as clickable icons on the website, and will be viewable by any attendee who clicks on that symbol.

If attendance allows regular length talks, these will be limited to 30 minutes, a time that includes interruptions for questions, and final discussion. It would be best to plan for 20-24

minutes of actual speaking. The talks should be aimed not at specialists, but at a general scientific audience.

If there are more than 42 attendees wanting to present research, then the organizer will either choose some talks to be of shorter duration, or in extremity, decide which attendees will give presentations. Thus when filling out the information on this page please indicate if you might be willing to 1) give a shorter talk; 2) forego giving a talk. Also indicate where requested the conference days (1 through 6) on which you will be present and willing to present.

Speaker	Baddeley, Roland
Author 1	Baddeley, Roland Bristol University
Title	Predicting the future: why deep neural networks generalise, and standard statistics often does not
Abstract	Deep neural networks generalise very well. Whilst it is perhaps not surprising that they fit their training data well: deep networks can act as lookup tables (perfectly fitting their training data, but displaying chance levels of generalisation), what is more surprising is that when trained with standard methods (mini batch gradient descent, dropout, residual architectures), they often generalise extremely well to unseen data. Why this happens is not well understood. Here we start with a simpler problem: estimating the parameters of exponential family distributions (probabilities, standard deviations...), so as to maximise this generalisation ability. Starting with the unrealistic (but ubiquitous) assumption that the data actually came from the model (it is well specified), we show how optimal estimators can be found, and that most standard estimators (both frequentist and Bayesian) are systematically biased: behaving as if there were more information provided by the data than is warranted (and hence failing to generalise). Directedly applying this analysis to deep neural networks is difficult due to the nature of the relative entropy loss involved, but by viewing network training as finding the long-term stable solution of a discretely simulated stochastic differential equation, good approximations can be found utilising two closely related metrics: the relative fisher information metric, and the earth mover (Wasserstein) distance. Using these, and well-known inequalities, we show that, with appropriate parameters, deep neural networks can approximate an optimal Bayes risk estimator. We show how the noise (due to sampling, and dropout), determines the metric tensor of the space, and hence an implicit "prior", and how the noise penalises curvature, and hence optimally smooth solutions are found. We then show that when trained with real data, where all models are wrong, but some are still useful, Bayesian estimators can be bad, but the approximations used by deep neural networks can still work. In summary, with appropriate parameters, deep neural networks are a sampling-based approximation to the minimum risk solution. They may not always find this solution, but simple diagnostics are available to show if this solution has been found. If time permits, I

	will describe one way that deep networks differ systematically from our visual systems. Deep neural networks impose translation symmetry through convolution (exploiting the translation invariance of the heat group). Human visual systems also impose translation symmetry (say via complex cells), but also display scale invariance/symmetry. One consequence of this is that deep neural networks find solutions that are dominated by high spatial frequencies compared to those used by human observers: many of the perceived "failures" of deep neural networks are simply due to them looking at the world differently from humans in terms of spatial frequencies. This should be simple to correct.

Speaker	Burns, Devin
Author 1	Burns, Devin Missouri S&T
Author 2	Balakrishnan, S N Missouri S&T
Author 3	Zhang, Qizi Missouri S&T
Title	Mere Measurement Effects in Quantum Decision Making
Abstract	A classic motivation for using quantum probability models to represent decision making is that order in which information is presented has a measurable impact on the final judgment. Many paradigms for quantifying these order effects require that participants give a preliminary judgment after the first piece of evidence. Quantum theory tells us that the very act of making this preliminary judgment should alter the state of the decision system in what we call a "mere measurement" effect. New data is presented where we explicitly attempt to quantify the size of this effect in a standard order of presentation experiment.

Speaker	Chandramouli, Suyog
Author 1	Chandramouli, Suyog Indiana University, Bloomington
Author 2	Shiffrin, Richard Indiana University, Bloomington
Title	An Extended form of Bayesian Inference and its application to 'Reproducibility'
Abstract	The 'reproducibility crisis' concerns reliability of reported data patterns. In this talk/poster, I will present our extension of Bayesian

	inference that focuses on data rather than models. In our system, observations in an experiment are considered to be a sample from a true underlying distribution of data outcomes of which we lack complete knowledge. The focus of reproducibility is usually a limited study outcome we term a data statistic. We therefore carry out Bayesian inference on the very large space of distributions of data statistics, basing inference on three factors: 1) The likelihood of the observed data statistic. 2) Our prior knowledge (such as the results of earlier studies and theories). 3) Our estimate of a variety of biases (experimenter-induced or otherwise) that often distort the truth and affect the validity of the reported data. The result is a posterior distribution of our beliefs about the size of the data statistic.The biases are critical for scientific inference; these include selective deletion of data before reporting, programming errors, measurement error, and publication bias to name a few. We focus on estimates of statistic size because it is validity of statistical reports and not just their reproducibility that is the true target of science. The inclusion of potential and perhaps likely biases in inference allows statistical inference to better match scientific conclusions. We illustrate by applying the method to results from an ESP experiment. Showing how conclusions change in accord with the beliefs and viewpoints of ESP proponents and skeptics.

Speaker	Dunn, John
Author 1	Dunn, John University of Western Australia
Author 2	Rao, Li-Lin Institute of Psychology, Chinese Academy of Sciences
Title	Models of risky choice: A state-trace analysis
Abstract	Risky choice involves selection between two or more options each of which is a set of n ordered pairs, (xi,pi), where xi is a (positive, negative, or zero) payoff and pi is its probability of occurrence and summing to one. There are a large number of different models of risky choice that fall into two broad classes; independent utility models that satisfy the condition of simple scalability and everything else. A prominent example of the former is Cumulative Prospect Theory, a prominent example of the latter is Decision Field Theory. While it is known that behaviour can be observed that inconsistent with all models, this has largely been based on the construction of special cases. We use state-trace analysis to test the class of independent utility models against a set of relatively unselected risky choices. The advantage of this approach is that there is no requirement to posit a particular form for the error function that links the difference in the utilities of two gambles, A and B, with the probability of choosing A over B. We presented groups of participants with 30 alternative gambles (A) each paired with one of

	four base gambles (B) and tested the prediction of all independent utility models that the probability of the base option has the same order over A for all B. We discuss the implications of the results and explore the question of testing more complex models.

Speaker	French, Bob
Author 1	French, Bob LEAD-CNRS, University of Burgundy, Dijon, France
Author 2	Glady, Yannick University of Burgundy
Author 3	Thibaut, Jean-Pierre University of Burgundy, Dijon, France
Title	Analyzing eye-tracking data to solve an outstanding problem in analogy-making
Abstract	In recent years eye-tracking has begun to be used to study the dynamics of analogy making. There are numerous scanpath-comparison algorithms and machine-learning techniques that can be applied to the raw eye-tracking data. We show how scanpath-comparison algorithms, combined with multidimensional scaling and a classification algorithm, can be used to resolve an outstanding question in analogy making -- namely, whether or not children's and adults' strategies in solving analogy problems are different. (They are.) We show which of these scanpath-comparison algorithms is best suited to the kinds of analogy problems that have formed the basis of much analogy-making research over the years. Further, we use machine-learning classification algorithms to examine the item-to-item saccade vectors making up these scanpaths. We show which of these algorithms best predicts from very early on in a trial, based on the frequency of various item-to-item saccades, whether a child or an adult is doing the problem. This type of analysis can also be used to predict, based on the item-to-item saccade dynamics in the first third of a trial, whether a problem will be solved correctly or not.

Speaker	Hanson, Andrew
Author 1	Hanson, Andrew Indiana University
Title	Matching Stuff with Quaternions and Hough
Abstract	We look at two matching problems. First, we discuss the classic quaternion RMSD (root-mean-square deviation) method that calculates an optimal 3D rotation to match two data sets. It turns out that a quaternion eigenvalue minimizes the RMSD of a set of test data points relative to a reference set of corresponding points.

	Similar literature in many fields of data analysis, including aeronautics, photogrammetry, and proteomics, has used opaque numerical methods exploiting quaternions to solve this problem for half a century. We have obtained new results for previously unknown exact algebraic solutions to the RMSD problem and related problems for quaternion orientation frames. This is a bit of a stretch for an average ASIC topic, but one can think of this as a piece of the model selection problem, and you never know when you are going to meet a data set like this! Then we observe how the Hough transform used in bubble chamber physics a half century ago provides an ideal realization of the Bayesian incremental accumulation of evidence for a wide variety of shape models. Again, you never know when you might need something like this...you can even use it for deciding on the best match for stellar polarization evidence concerning galactic magnetic fields.

Speaker	Harding, Samuel
Author 1	Harding, Samuel Indiana University
Author 2	Shiffrin, Richard Indiana University
Title	Object Recognition When Features Arrive Dynamically
Abstract	Efficient allocation of visual attention allows for focused processing of relevant information and the suppression of distractors. The processes responsible for the guidance of visual attention have been extensively studied within the context of visual search tasks, which require that subjects comb through displays containing a large number of objects, in order to determine if any of the items belong to the "target" category, or if the display consists entirely of distractors. Rapid search through such displays for well-learned stimuli suggests that attention can be guided towards targets as a result of recognition decisions gained from prior experience and stored in memory. By leveraging a novel, sequential presentation paradigm, we sought to explore the dynamics of object recognition for well-learned items, when information about their identity was slowly made available across the course of each trial. We presented individual features of simple geometric objects in a sequential fashion, such that features containing diagnostic information about the object's identity were shown either first or last, with varying amounts of delay between successive features. The results revealed a strong effect of the earliest features on both accuracy and response times, and we propose a dynamic model based on one reported in Cox & Shiffrin (2017), which can account for these patterns via continuous interactions between perceptual feature sampling, memory search, and decision processes. Bayesian estimation of model parameters produced good fits to both response proportions

	and reaction time distributions.

Speaker	Holden, John
Author 1	Holden, John Complexity Group, Psych. Dept., University of Cincinnati
Author 2	Annand, Colin Complexity Group, Psych. Dept., University of Cincinnati
Author 3	Amon, Mary Jean Developmental Cognitive Neuroscience Laboratory, Department of Psychological and Brain Sciences, Indiana University Bloomington
Title	Cognitive Dynamics: Additive or Multiplicative and Beyond?
Abstract	Saul Sternberg's additive factors logic was disseminated in 1969. Nevertheless, questions surrounding the viability of the modularity and additivity assumptions persists. Many cognitive factors that impact human performance are known. However, they rarely combine additively in factorial manipulations. The problem may stem from inaccurate assumptions and/or misidentified factors. Here, a manipulation inspired by the renormalization group operation in statistical physics is used to test the assumptions of additivity and independence required by the modularity hypothesis. If there is a stable cognitive architecture, then repeatedly executing the same cognitive act should repeatedly engage the same cognitive architecture. Essentially, independent versions of the same judgment are repeated several times to "course-grain" a given cognitive act across time. If the discreet sub-acts behave in a manner consistent with a sum of independent random variables, then it is reasonable to assume an additive and modular cognitive substrate. On the other hand, if they develop dependencies, then one might reevaluate the assumption of additivity and modularity in the cognitive substrate supporting performance. Each of three studies require participants to successively execute identical elementary cognitive acts. If the successive sub-acts governing each whole cognitive act behave as independent variables, then the variability of the conditions should grow additively as the sum of the successive sub-act variances. Instead, the results indicate that variance grows exponentially as a function of the number of sub-acts. A straightforward way to generate this pattern of variability growth is to assume the sub-acts develop successive dependencies and combine multiplicatively.

Speaker	Landy, David
Author 1	Landy, David Indiana University Bloomington; Netflix

Author 2	Attari, Shahzeen Indiana University Bloomington
Author 3	Marghetis, Tyler Indiana University Bloomington
Author 4	Miniard, Deidra Indiana University
Author 5	Brower, Eleanor Indiana University
Title	Understanding and correcting misperceptions of home energy use
Abstract	Public perceptions of energy use suffer from severe and systematic biases, and we lack interventions to correct these misperceptions. These misperceptions have the potential to undermine energy conservation efforts and support for climate policy. I will present two intertwined research projects. In the first, we tested two simple, potentially scalable interventions: providing multiple numerical anchors, and providing a written statement that mitigated a common misperception. Both succeeded in improving estimation skill. Only the manufactured heuristic, however, had benefits for judgments about energy-conserving behaviors. A Bayesian cognitive model suggests that the numerical anchors improved estimations without altering underlying understandings of energy use. In the second research project, we use a classic feature listing/feature rating task to attempt to decompose the structure of the beliefs used by relatively inexpert energy estimators. Experimentally, we asked people to rate each of roughly 30 appliances along a each of number of empirically derived features, such as whether the appliance has a (large) motor, uses (much) water, or moves on its own power. We used the ratings to predict their estimations of the energy used by the appliance. Taken together, these research strands illustrate the utility of laboratory cognitive science methods for understanding and mitigating important social problems.

Speaker	Lewandowsky, Stephan
Author 1	Lewandowsky, Stephan University of Bristol
Author 2	Oberauer, Klaus University of Zurich
Title	There is a replication crisis, but it can be good for science if (some) studies fail to replicate
Abstract	There is strong evidence that many-but by no means all-psychological phenomena are difficult to replicate independently. This "replication crisis" has been ascribed to various questionable research practices (QRPs), and the field has developed effective counter-measures to overcome those QRPs, such as preregistration and data transparency. Nonetheless, given the stochastic nature of

	data and the low a priori probabilities that exploratory hypotheses are true, replicability of a given finding will remain notably below 100% even if researchers conform to best contemporary practice. How is this inevitable residual lack of replicability best managed? We suggest that when the field as a whole is considered, scientific progress may be more rapid if published studies fail to replicate, rather than withholding publication of studies until they are replicated. This result arises because most findings, published or otherwise, find little echo in the market place of ideas, and their replication would therefore detract resources from other areas of science that are judged to be more interesting. We explore the boundary conditions of this trade-off and suggest ways in which it may be implemented.

Speaker	Little, Daniel
Author 1	Little, Daniel The University of Melbourne
Author 2	Moneer, Sarah The University of Melbourne
Author 3	Cheng, Xue Jun The University of Melbourne
Title	Evidence for a Fixed-Point Property in Categorization Response Time Data
Abstract	Many different attentional and decision making strategies can be conceptualized as mixture models. For instance, shifts between automatic and controlled processes could be considered mixtures of parallel and serial processing. This explanation has been favored in recent investigations of categorization using separable dimensions. One caveat to these recent conclusions is that mixtures of parallel and serial processing can often be mimicked by parallel models with inhibitory interactions. This talk will examine this mimicry. Mixture models have an important ``fixed-point'' property such that there is a single point of cross-over in the probability density functions generated from different mixture proportions. This property can be used to distinguish mixture models from other explanations. This talk will present evidence from two experiments using separable dimensions showing evidence for this fixed point property.

Speaker	Pecher, Diane
Author 1	Pecher, Diane Erasmus University Rotterdam, The Netherlands
Author 2	Zeelenberg, René

	Erasmus University Rotterdam, The Netherlands
Title	The effect of object size on grasping actions
Abstract	Grasping actions in response to pictures of graspable objects are influenced by the similarity between the response action itself and the actions that could be performed with the object. In this study we asked participants to classify objects as natural or artefact by grasping a thin (1 cm diameter) cylinder using the thumb and index finger (pinch) or a thick (6 cm diameter) cylinder using the entire hand (power grip). When the object sizes varied in width as the cylinders (e.g., blackberry and pear) we obtained congruency effects; responses were faster when object and cylinder were congruent in size than when they were not congruent in size. When object sizes varied in width between the thick cylinder and much larger (e.g., pear and watermelon), however, congruency effects were obtained according to relative size. This finding is problematic for the theory that object pictures automatically potentiate actions.

Speaker	Pestilli, Franco
Author 1	Pestilli, Franco Indiana University, Bloomington
Author 2	Pestilli, Franco Indiana University, Bloomington
Title	A Public Cloud Platform for Large-Scale Data Analysis, Visualization and Sharing of Reproducible Neuroscience Research.
Abstract	Neuroscience is at the forefront of science by reaching across disciplinary boundaries and promoting transdisciplinary research. This is a process that, in principle, can facilitate discovery by convergent efforts from theoretical, experimental and cognitive neuroscience, as well as computer science and engineering. To ensure the success of this process mechanisms to guarantee reproducibility of scientific results must be established. Open software development and data sharing are therefore paramount in the quest to achieve reproducibility. We present brainlife.io, a platform which addresses challenges of neuroscience reproducibility by providing integrative mechanisms for publishing data, and algorithms while embedding them with computing resources to impact multiple scientific communities. We present three main technological results with broad impacts on neuroscience research and discovery. First, we demonstrate that platform can process brain data, publish algorithms as reproducible applications, and perform data-intensive computing on clouds. Second, we present novel algorithms for mapping brain networks using clouds. These algorithms will enhance discovery by leveraging the online platform for data-intensive processing of large datasets. Third, we publish test-retest brain datasets and derived data (processed), such as connectome matrices, multi-parameters tractography models,

	cortical segmentation and functional maps. These datasets can be used as a reference or to develop algorithms for functional mapping, anatomical computing, and optimization. The platform represents a unique method and technology for publishing the full set of scientific research assets in a study comprising data and analyses code as well as all provenance information, embedded in a series of reproducible, open cloud platform web-services that allow collaborative tracking of the scientific process. We demonstrate that the core platform can integrate previously published data, and analyses to reproduce major published results in neuroscience. To promote open neuroscience, brainlife.io allows scientists to publish data and reproducible analyses with seamless access to national supercomputers. In sum, the brainlife.io platform provides access to algorithms, data, and computing resources to trainees and faculty nationwide. The entire platform and all technologies developed with it are freely available and open-source in order to contribute to the wide community of users and researchers in the neurosciences.

Speaker	Pothos, Emmanuel
Author 1	Pothos, Emmanuel City, University of London
Author 2	Basieva, Irina City, University of London
Author 3	Barque-Duran, Albert City, University of London
Author 4	Gloekner, Andreas Max Planck Institute for Research on Collective Goods
Author 5	Sholz, Agnes University of Zurich
Author 6	Von Helversen, Bettina University of Zurich
Title	Characterizing structure in eye tracking data
Abstract	Eye tracking has been extensively employed to study momentary shifts in attention during decision making and several researchers have attempted to establish links between characteristics of eye tracking dynamics and more directly relevant behavioral variables (e.g., the actual decisions). However, to our knowledge there have not been any attempts to directly model eye tracking dynamics in a decision task, including based on the dominant framework for decision dynamics generally, drift diffusion models. Can drift diffusion models be employed to describe eye tracking dynamics in a decision task? We argue that such models are not ideally suited to the task at hand and so motivate an alternative framework, based on open systems quantum theory. We model eye tracking curves from a decision task and explore the interpretability of parameters.

Speaker	Ratcliff, Roger
Author 1	Ratcliff, Roger Ohio State
Author 2	McKoon, Gail Ohio State
Title	Modeling representation and decision processes in numerosity decisions
Abstract	We review some counterintuitive results for two-choice numerosity decisions and show how models of drift rate and trial-to-trial variability in drift rate account for these results. The experiments also show that in some paradigms, perceptual variables affect performance a great deal and in others, hardly at all. This suggests that representations are task dependent. We then present data from two experiments in which numerosity and perceptual variables vary randomly across ranges of values and fit the data with a regression model for drift rate. This regression model is integrated with the diffusion decision model and the composite model is fit all at once using maximum likelihood. When perceptual variables and numerosity point to the same result, the model fits well, but when the task is to report the larger numerosity but perceptual variables point to the smaller numerosity, the model fails to fit a delay in the location of RT distributions. We suggest that these results show a new conflict effect. In another experiment in which the task is to report the larger area, conflicting numerosity has little effect on the location of RT distributions showing no hint of conflict and hence an asymmetry depending on the task.

Speaker	Shiffrin, Richard
Author 1	Shiffrin, Richard Indiana University
Title	Group discussion of the so-called 'reproducibility crisis'
Abstract	The attendees will exchange views: Is the practice of science going well our poorly? Is progress going well? Is there a real crisis? What are the real problems and what sort of remedies are appropriate and worthwhile? What is the ole of statistics? Should statistics govern the practice of science or science govern the practice of statistics? What type of statistical practice is best?

Speaker	Shiffrin, Richard
Author 1	Shiffrin, Richard Indiana University

Author 2	Kumar, Kiran Indiana University
Author 3	Harding, Sam Indiana University
Title	Using cursor movements to measure attention
Abstract	The present research infers aspects of spatial attention from movement to targets (and preferably not to foils) of a mouse controlled cursor on a computer monitor. The long-term goal is a data-rich and rapid assessment technique that can be used to diagnose individual and clinical deficits of attention. The aim of the present research is validating the approach using a college population of subjects. In the experiment, participants attempt to move a cursor toward three spatial positions at which targets appear rapidly but at irregular times, and attempt to inhibit movements toward foils appearing at those positions. We assume that cursor movements toward a position indicates attention has been directed toward that position. A modified Hidden Markov Model (HMM) uses five sources of evidence, all based on parameters to be estimated, to predict the time varying movement of attention: four aspects of cursor movement and a probability that attention will move from one time interval to the next. Five minutes of data are used to estimate parameters for each subject that produce a predicted attention trajectory which best matches what the subject is instructed to do. These parameters are used to predict the attention trajectory for the remainder of the hour of testing. The predictions of attention movements are then matched to the appearance of targets and foils to infer such components of attention as ability to respond to targets vs foils, times to do so, and changes in these components over time. The results illustrate a promising approach to assessment of attention that could likely be employed for both adults and children in clinical settings requiring short testing period.

Speaker	Shiffrin, Richard
Author 1	Shiffrin, Richard IndianaUniversity
Author 2	Cao, Rui Indiana University
Author 3	Nosofsky, Robert Indiana University
Author 4	Busey, Tom Indiana University

Author 5	Woodman, Geoff Vanderbilt University
Title	Development of automaticity in short term memory tracked with EEG
Abstract	Shiffrin and Schneider (1977) demonstrated that highly efficient memory- and visual-search performance could be achieved through consistent item-to-response mapping (CM) training. It is theorized that subjects shifted from relying on working memory to learned item-response associations in long-term memory (Logan, 1988). The theory was tested and explored mostly through behavioral experiments and computational modeling. In a recent series of articles involving visual search (e.g. Woodman et al, 2013; Carlisle et al. 2011), Woodman and colleagues found that the contralateral-delay activity (CDA) of human event-related potentials is related to the maintenance of information in visual working memory and that the magnitude of the CDA decreases when target information is stored in long-term memory. We employed the CDA and other neural measures to study the nature of memory retrieval in CM memory search tasks. We observed a significant reduction in the magnitude of the CDA in CM training compared to a control condition in which item- response mappings varied from trial to trial (VM). The results provided converging evidence supporting the classic theoretical interpretation of the bases for CM and VM memory search. The results also raised interesting questions concerning the detailed interpretation of CDA.

Speaker	Sikström, Sverker
Author 1	Sikström, Sverker Lund university
Author 2	Kjell, Oscar Lund university
Author 3	Lundberg, Katarina Lund university
Title	Statistically Measuring and Describing Psychological Constructs with Words, not Numbers
Abstract	Psychological constructs, such as emotions, thoughts and attitudes are often measured by asking individuals to reply to questions using closed-ended numerical rating scales. However, when asking people about their state of mind in a natural context (“How are you?”), we receive open-ended answers using words (“fine and happy”) and not closed-ended answers using numbers (“7”). Nevertheless, responses to open-ended questions have, to date, been difficult to

	quantify objectively. We develop an approach using open-ended questions in which the responses are analyzed using statistical semantics (Latent Semantic Analyses). This open-ended, semantic questions approach is compared with traditional rating scales in nine studies including two different study-paradigms. The first paradigm requires participants to describe psychological aspects of objective stimuli (facial expressions) and the second paradigm involves asking participants to report their subjective well-being and mental health problems. The results demonstrate that the semantic questions approach yields good statistical properties with competitive, or higher, validity and reliability than corresponding numerical rating scales. As these semantic measures are based on natural language and both measure and describe psychological constructs, they have the potential of complementing and extending traditional rating scales.

Speaker	Sloutsky, Vladimir
Author 1	Sloutsky, Vladimir The Ohio State University
Title	Representation of Regular and Exception Items in Category Learning: It is not What you May Think
Abstract	Evidence from multiple category learning studies suggest that exceptions to the category rule are remembered better than items that follow the rule. Based on differences in recognition memory, it has been suggested that category exceptions may be represented differently than other category members. Here we present experiments investigating representations of regular and exceptional category members and potential developmental changes in these representations. Although 4-year-olds and adults demonstrated different memory patterns, both age groups have shown (a) higher memory sensitivity for regular members of the category and (b) isomorphic memory representations for regular and exception items. Additionally, we have found asymmetry in generalization patterns for regular items and exceptions. Features of regular items contributed significantly more than exceptions' features in making category decisions about new items. These findings (1) challenge the hypothesis that items that violate known knowledge structure have a special status in memory and (2) suggest that exceptions can be represented as a subset of regular items.

Speaker	Solomon, Ethan
Author 1	Solomon, Ethan University of Pennsylvania
Author 2	Kahana, Michael University of Pennsylvania

Title	Memory networks in the human brain: Integrating over scales and approaches
Abstract	The human brain has long been conceptualized as a dynamical system of interacting parts, but it is largely unknown how diverse brain structures work together to generate episodic memory. Neurosurgical patients with indwelling electrodes present a unique opportunity to study functional connections between brain regions during memory encoding and retrieval, through both passive recording and electrical stimulation. Here, I will describe our recent efforts to characterize brain networks that support memory via correlative and causal approaches. Moreover, I discuss unifying motifs in human electrophysiology that were revealed through these connectomic studies. Briefly, we have characterized functional, memory-related networks at two scales: (1) the whole brain and (2) within the medial temporal lobe (MTL), a critical locus of episodic memory. Common to both networks are strengthened low-frequency connections during successful episodic encoding and retrieval. Furthermore, many canonical memory regions emerge as hubs of such low-frequency connections, including the lateral frontotemporal cortices, the parahippocampal gyrus – and within it – the entorhinal cortex. High-frequency bands (i.e. gamma, 30+ Hz) almost exclusively exhibit desynchronization during successful memory operations. We recently extended these correlative studies and used intracranial stimulation to ask whether functional connections imply causality. We confirmed that electrical stimulation within the MTL evokes increases in theta power at remote regions, as predicted by the strength of low-frequency functional connections. However, this relationship held true only so long as stimulation occurred in or near white matter. Taken together, we demonstrate the importance of low-frequency connectivity to episodic memory, integrating these findings over spatial scales and through causal and correlative approaches.

Speaker	Vandekerckhove, Joachim
Author 1	Vandekerckhove, Joachim University of California, Irvine
Author 2	Baribault, Beth University of California, Irvine
Title	Robust tests of theory with randomly sampled experiments
Abstract	I will describe and demonstrate a design strategy useful for replicating empirical effects in psychological science. The strategy involves the indiscriminate randomization of independent experimental variables that may be moderators of a to-be replicated empirical finding, and can be used to test the robustness of an empirical claim to some of the vagaries and idiosyncrasies of

	experimental protocols. By the same theory of generalizability that licenses inference from a sample of participants to a population, I propose to generalize from a sample of experiments to a well-defined space of possible experiments. The strategy is made feasible by automation of experiments and by advances in Bayesian inference that allow for the pooling of information across experiments and designs. I will demonstrate the practical feasibility of the strategy with a replication of a study on subliminal priming.

Speaker	Ziegler, Johannes
Author 1	Ziegler, Johannes Aix-Marseille University and Centre National de la Recherche Scientifique
Author 2	Perry, Conrad Faculty of Health, Arts and Design, Swinburne University of Technology, Hawthorn, Australia
Author 3	Zorzi, Marco Department of General Psychology and Padova Neuroscience Center, University of Padova, Padova, Italy
Title	Understanding dyslexia through personalized large-scale computational models
Abstract	Learning-to-read is foundational for literacy development, yet a large percentage of children in primary school (~5-17%) fail to become efficient readers despite normal intelligence and schooling, a condition referred to as developmental dyslexia (DD). DD has been hypothesized to occur due to deficits in vision, attention, auditory/temporal processes, and phonology/language. Here, we used a developmentally plausible computational model of reading acquisition to show how the core deficits of dyslexia determine individual learning outcomes for 622 children (388 dyslexics). We show that individual learning trajectories can be simulated on the basis of three component skills related to orthography, phonology, and vocabulary. Alternatively, single deficit models were able to capture the means but not distribution of results, and a model with noise added to all representations could not even capture the means. These results suggest that individual differences can only be accurately simulated with a model that allows for multiple deficits.

Speaker	Zorzi, Marco
Author 1	Zorzi, Marco University of Padova
Author 2	Testolin, Alberto University of Padova
Title	An emergentist perspective on the origin of number sense

Abstract	The finding that human infants and many other animal species are sensitive to numerical quantity has been widely interpreted as evidence for evolved, biologically determined numerical capacities across unrelated species, thereby supporting a 'nativist' stance on the origin of number sense. Here, we tackle this issue within the 'emergentist' perspective provided by artificial neural network models to show that numerical representations need not be genetically pre-determined but can emerge from the interplay between innate architectural constraints and domain-general learning mechanisms. We show that deep neural networks endowed with basic visuospatial processing exhibit a remarkable performance in numerosity discrimination before any experience-dependent learning, whereas unsupervised sensory experience with visual sets leads to subsequent improvement of number acuity and reduces the influence of continuous visual cues. The emergent neuronal code for numbers in the model includes both numerosity-sensitive (summation coding) and numerosity-selective response profiles, closely mirroring those found in monkey intraparietal neurons. We conclude that a form of innatism based on architectural and learning biases is a fruitful approach to understanding the origin and development of number sense.

Contact with questions.