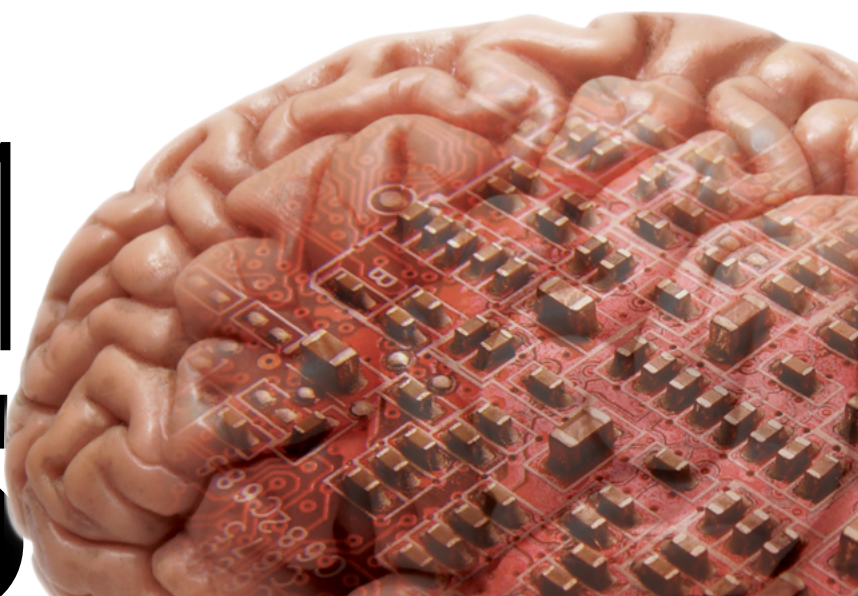


Program

ICCM 2015

13th International Conference on Cognitive Modeling

April 8-11, Groningen, The Netherlands



Conference-at-a-Glance

ICCM
2015

Wednesday – April 8

Tutorials & Workshops

9.00-17.00h

- *Workshop:* Interactive Task Learning – John Laird & Kevin Gluck

- *Tutorial:* Nengo, Neural Engineering, and Cognition – Terry Stewart & Peter Blouw

13.00-17.00h

- *Tutorial:* Computational Models and Simulation of Classical Conditioning – Eduardo Alonso & Esther Mondragon

Thursday – April 9

Day 1

8:15 Registration

8:45-9:00h

Welcome

9.00-10.00h

Keynote: Mark Steyvers

10.00-10.40h

Talks: Connectionist Models

- *Coffee & Tea Break* -

11.10-12.30h

Talks: Model Formalization

12.30-14.00h

Poster Session I & Lunch

14.00-15.30h

Symposium: Neural Correlates of Cognitive Models

- *Coffee & Tea Break* -

16.00-17.00h

Talks: Social Cognition

18.00h

Reception @ Academy Building

Friday – April 10

Day 2

8:30 Registration

9.00-10.00h

Keynote: Pieter R. Roelfsema

10.00-10.40h

Talks: Exploration & Surprise

- *Coffee & Tea Break* -

11.10-12.30h

Talks: Memory

12.30-14.00h

Lunch on your own

14.00-15.00h

NWO Open Access Symposium:

Open Access for Cognitive Models

15.00-16.00h

Talks: Perception & Working Memory

16.00-17.30h

Poster Session II & Drinks

19.30h

Conference Dinner

Saturday – April 11

Day 3

8:30 Registration

9.00-10.00h

Keynote: John R. Anderson

10.00-10.40h

Talks: Decision Making

- *Coffee & Tea Break* -

11.10-12.30h

Talks: Human-Computer Interaction

12.30-14.00h

Lunch on your own

14.00-15.30h

Symposium: Unified Theories of Cognition: Newell's Vision after 25 Years

- *Coffee & Tea Break* -

16.00-17.00h

Talks: Distraction & Fatigue

Wednesday – April 8

Thursday – April 9

Friday – April 10

Saturday – April 11

Wednesday – April 8

Tutorials & Workshops

Workshop: Interactive Task Learning (9.00 – 17.00h)

John Laird & Kevin Gluck

Advances in Artificial Intelligence, Cognitive Science, and Robotics are leading us to future autonomous systems that will have the cognitive and physical capabilities to perform a wide variety of tasks, with applications across science, health care, business, military, home, and entertainment. How will these robotic and agent systems learn the unanticipated and evolving complex tasks we want them to perform? Although many related areas of science and technology will play a role in answering this question, the focus of this workshop is on how cognitive modeling research can inform the quest for achieving interactive task learning – agents and robots acquiring new tasks through natural interactions with humans. What capabilities can we identify and model in humans that enable (and are potentially necessary for) interactive task learning, what are the most important relevant successes so far, and what are the most important research challenges that need to be addressed?

We seek a balance between thought-provoking keynote-style presentations and active participation by workshop attendees in producing answers to the three questions mentioned above in the abstract.

Tutorial: Nengo, Neural Engineering, and Cognition (9.00 – 17.00h)

Terry Stewart & Peter Blouw

This tutorial introduces the Neural Engineering Framework, a general-purpose method for implementing computational algorithms using realistic spiking neurons. It has been used to develop biologically realistic models of visual processing, motor control, planning, mental arithmetic, and analogy, as well as Spaun, the first large-scale brain simulation capable of performing multiple tasks. In this tutorial, we cover the underlying theoretical framework while giving hands-on examples of building and running models using Nengo, our cross-platform open-source neural simulation software. Participants will be expected to bring a laptop and follow along.

While we have provided this tutorial in the past, there are two major differences this year. First, the newest version of Nengo has extensive support for running on different hardware such as GPUs, allowing for significantly larger neural models. Secondly, these larger models allow for more complex cognitive models, including novel approaches to linguistic processing and complex rule following.

Tutorial: Computational Models and Simulation of Classical Conditioning (13.00 – 17.00h)

Eduardo Alonso & Esther Mondragon

It is widely accepted that classical conditioning is at the basis of most learning phenomena and behavior and thus paramount that we understand well how its mechanisms have been modeled computationally. This tutorial will focus on two influential implementations, namely Rescorla and Wagner's model (RW) and Temporal Difference (TD, aka Reinforcement Learning). In the first hour we will present the fundamentals of classical conditioning and error-correction learning, and explain in more detail how these are instantiated in both trial-based (RW) and real-time (TD) representations. The next two hours will be dedicated to run simulations of the two models in specialized software, RW Simulator and TD Simulator respectively. The tutees will learn the basics of their functioning, how to input data (experimental designs, parameter values) and how to interpret output against a selected collection of experimental data as well as with regards to novel predictions.

Thursday – April 9

Day 1

8.15 Registration

8.45 Welcome

Niels Taatgen, Marieke van Vugt, Jelmer Borst, & Katja Mehlhorn

9.00 **Keynote: Combining Human Judgments in General Knowledge and Forecasting Tasks**

Mark Steyvers, University of California, Irvine

10.00 **Talks: Connectionist Models**



A Connectionist Semantic Network Modeling the Influence of Category Member Distance on Induction Strength

Michael Vinos, Efthymios Tsilionis, & Athanassios Protopapas

ALLEN NEWELL AWARD – HONORABLE MENTION

Explorations in Distributed Recurrent Biological Parsing

Terrence Stewart, Peter Blouw, & Chris Eliasmith

10.40 – Break –

11.10 **Talks: Model Formalization**

Abstraction of analytical models from cognitive models of human control of robotic swarms

Katia Sycara, Christian Lebiere, Yulong Pei, Don Morrison, Yuqing Tang, & Michael Lewis

A Method for Building Models of Expert Cognition in Naturalistic Environments

Korey MacDougall, Matthew Martin, Nathan Nagy, & Robert West

Mathematical Formalization and Optimization of an ACT-R Instance-Based Learning Model

Nadia Said, Michael Engelhart, Christian Kirches, Stefan Körkel, & Daniel V. Holt

A specification-aware modeling of mental model theory for syllogistic reasoning

Yutaro Sugimoto & Yuri Sato

12.30 **Poster Session I & Lunch (provided)**

see next page for a listing of posters

14.00 **Symposium: Neural Correlates of Cognitive Models**

Marcel van Gerven, Sennay Ghebreab, Guy Hawkins, & Jelmer Borst

15.30 – Break –

16.00 **Talks: Social Cognition**



The Role of Simple and Complex Working Memory Strategies in the Development of First-order False Belief Reasoning: A Computational Model of Transfer of Skills

Burcu Arslan, Stefan Wierda, Niels Taatgen, & Rineke Verbrugge

ALLEN NEWELL AWARD – HONORABLE MENTION

A Two-level Computational Architecture for Modeling Human Joint Action

Jens Pfau, Liz Sonenberg, & Yoshi Kashima

Metacognition in the Prisoner's Dilemma

Christopher Stevens, Niels Taatgen, & Fokje Cnossen

18.00 **Welcome Reception @ Academy Building**

Thursday – April 9

Day 1 - Poster Session I

1. **Modeling the Workload Capacity of Visual Multitasking**
Leslie Blaha, James Cline, & Tim Halverson
2. **SIMCog-JS: Simplified Interfacing for Modeling Cognition - JavaScript**
Tim Halverson, Brad Reynolds, & Leslie Blaha
3. **Modeling Password Entry on a Mobile Device**
Melissa Gallagher & Mike Byrne
4. **Fast-Time User Simulation for Dynamic HTML-based Interfaces**
Marc Halbrügge
5. **Cognitive Modelling for the Prediction of energy-relevant Human Interaction with Buildings**
Jörn von Grabe
6. **Visual Search of Displays of Many Objects: Modeling Detailed Eye Movement Effects with Improved EPIC**
David E. Kieras, Anthony Hornof, & Yunfeng Zhang
7. **An Adaptable Implementation of ACT-R with Refraction in Constraint Handling Rules**
Daniel Gall & Thom Frühwirth
8. **Supraarchitectural Capability Integration: From Soar to Sigma**
Paul S. Rosenbloom
9. **Populating ACT-R's Declarative Memory with Internet Statistics**
Daniela Link & Julian Marewski
10. **Tracking memory processes during ambiguous symptom processing in sequential diagnostic reasoning**
Agnes Scholz, Josef Krems, & Georg Jahn
11. **Mathematical modeling of cognitive learning and memory**
Vipin Srivastava & Suchitra Sampath
12. **Modeling Choices at the Individual Level in Decisions from Experience**
Neha Sharma & Varun Dutt
13. **Expectations in the Ultimatum Game**
Peter Vavra, Luke Chang, & Alan Sanfey
14. **Quantifying Simplicity: How to Measure Sub-Processes and Bottlenecks of Decision Strategies Using a Cognitive Architecture**
Hanna Fechner, Lael Schooler, & Thorsten Pachur
15. **Reducing the Attentional Blink by Training: Testing Model Predictions Using EEG**
Trudy Buwalda, Jelmer Borst, Marieke van Vugt, & Niels Taatgen
16. **Explaining Eye Movements in Program Comprehension using jACT-R**
Sebastian Lohmeier, & Nele Russwinkel
17. **Affordances based k-TR Common Coding Pathways for Mirror and Anti-Mirror Neuron System Models**
Karthik Mahesh Varadarajan
18. **Functional Cognitive Models of Malware Identification**
Christian Lebiere, Stefano Bennati, Robert Thomson, Paulo Shakarian, & Eric Nunes
19. **The value of time: Dovetailing dynamic modeling and dynamic empirical measures to conceptualize the processes underlying delay discounting decisions**
Stefan Scherbaum, Simon Frisch, & Maja Dshemuchadse
20. **Combining Dynamic Modeling and Continuous Behavior to Explore Diverging Accounts of Selective Attention**
Simon Frisch, Maja Dshemuchadse, Thomas Goschke, & Stefan Scherbaum

Friday – April 10

Day 2

8.30 Registration

9.00 **Keynote: Interactions between attention and reward for the guidance of plasticity, learning and memory**

Pieter R. Roelfsema, Netherlands Institute for Neuroscience

10.00 **Talks: Exploration & Surprise**

Exploration-Exploitation in a Contextual Multi-Armed Bandit Task

Eric Schulz, Emmanouil Konstantinidis, & Maarten Speekenbrink



Predicting Surprise Judgments from Explanation Graphs

Meadhbh Foster & Mark Keane

ALLEN NEWELL AWARD – HONORABLE MENTION

10.40 – Break –

11.10 **Talks: Memory**



Reconciling two computational models of working memory in aging

Violette Hoareau, Benoit Lemaire, Sophie Portrat, & Gaen Plancher

ALLEN NEWELL AWARD – HONORABLE MENTION



Stability of Individual Parameters in a Model of Optimal Fact Learning

Florian Sense, Friederike Behrens, Rob R. Meijer, & Hedderik van Rijn

ALLEN NEWELL AWARD – BEST STUDENT PAPER

Spontaneous Retrieval for Prospective Memory: Effects of Encoding Specificity and Retention Interval

Justin Li & John Laird

Holographic Declarative Memory and the Fan Effect: A Test Case for A New Memory Module for ACT

Matthew Kelly, Kam Kwok, & Robert West

12.30 – Lunch on your own –

14.00 **NWO Open Access Symposium: Open Access for Cognitive Models**

Dario Salvucci & Caspar Addyman

15.00 **Talks: Perception & Working Memory**

Modeling Two-Channel Speech Processing with the EPIC Cognitive Architecture

David E. Kieras, Gregory H. Wakefield, Eric R Thompson, Nandini Iyer, & Brian D. Simpson

How does prevalence shape errors in complex tasks?

Enkhbold Nyamsuren, Han van der Maas, & Niels Taatgen

When and Why Does Visual Working Memory Capacity Depend on the Number of Visual Features Stored: An Explanation in Terms of an Oscillatory Model

Krzysztof Andrelczyk, Adam Chuderski, & Tomasz Smolen

16.00 **Poster Session II**

see next page for a listing of posters

19.30 **Conference Dinner**

Friday – April 10

Day 2 - Poster Session II

1. **How should we evaluate models of segmentation in artificial language learning?**
Raquel G. Alhama, Remko Scha, & Willem Zuidema
2. **A constraint-based approach to pronoun interpretation in Italian**
Margreet Vogelzang, Hedderik van Rijn, & Petra Hendriks
3. **Investigating the semantic representation of Chinese emotion words with co-occurrence data and self-organizing maps neural networks**
Yueh-lin Tsai, Hsueh Chih Chen, & Jon-fan Hu
4. **Understanding the Misunderstood**
David Tobinski & Oliver Kraft
5. **Towards a unified reasoning theory: An evaluation of the Human Reasoning Module in Spatial Reasoning**
Matthias Frorath, Rebecca Albrecht, & Marco Ragni
6. **The Ship of Theseus: Using mathematical and computational models for predicting identity judgments**
Tuna Çakar & Annette Hohenberger
7. **Modelling insight: The case of the nine-dot problem**
Thomas Ormerod, Patrice Rusconi, Adrian Banks, & James MacGregor
8. **Cognitive Models Predicting Surprise in Robot Operators**
David Reitter, Yang Xu, Patrick Craven, Anikó Sándor, R. Chris Garrett, E. Vince Cross, & Jerry L. Franke
9. **Cue confusion and distractor prominence explain inconsistent effects of retrieval interference in human sentence processing**
Felix Engelmann, Lena Jaeger, & Shravan Vasishth
10. **A spreading activation model of a discrete free association task**
Vencislav Popov
11. **Fail fast or succeed slowly: Good-enough processing can mask interference effects**
Bruno Nicenboim, Felix Engelmann, Katja Suckow, & Shravan Vasishth
12. **Evaluating Instance-based Learning in Multi-cue Diagnosis**
Christopher Myers, Kevin Gluck, Jack Harris, Vladislav Veksler, Thomas Mielke, & Rachel Boyd
13. **The Influence of Cognitive Strategies on Performance in Working Memory Tasks**
Menno Nijboer, Jelmer Borst, Hedderik van Rijn, & Niels Taatgen
14. **Numerical Induction beyond Calculation: An fMRI Study in Combination with a Cognitive Model**
Xiuqin Jia, Peipeng Liang, Xiaolan Fu, & Kuncheng Li
15. **Is it lie aversion, risk-aversion, or IRS aversion? Modeling deception under risk and no risk**
Tei Laine, Tomi Silander, Kayo Sakamoto, & Ilya Farber
16. **Should Androids Dream of Electric Sheep? Mechanisms for Sleep-dependent Memory Consolidation**
George Kachergis, Roy de Kleijn, & Bernhard Hommel
17. **Social Categorization Through the Lens of Connectionist Modeling**
Andre Klapper, Iris van Rooij, Ron Dotsch, & Daniel Wigboldus

Saturday – April 11

Day 3

8.30 Registration

9.00 *Keynote: The Sequential Structure of Thought*

John R. Anderson, Carnegie Mellon University

10.00 *Talks: Decision Making*

Speed-accuracy trade-off behavior: Response caution adjustment or mixing task strategies?

Leendert van Maanen

An Instrumental Cognitive Model for Speeded and/or Simple Response Tasks

Royce Anders, F.-Xavier Alario, & Leendert van Maanen

10.40 – Break –

11.10 *Talks: Human-Computer Interaction*

Password Entry Errors: Memory or Motor?

Kristen Greene & Franklin Tamborello

Toward Expert Typing in ACT-R

Robert St. Amant, Prairie Rose Goodwin, Ignacio Dominguez, & David Roberts

A Predictive Model of Human Error based on User Interface Development Models and a Cognitive Architecture

Marc Halbrügge, Michael Quade, & Klaus-Peter Engelbrecht

An Activation-Based Model of Routine Sequence Errors

Laura Hiatt & Greg Trafton

12.30 – Lunch on your own –

14.00 *Symposium: Unified Theories of Cognition: Newell's Vision after 25 Years*

Glenn Gunzelmann, Paul Rosenbloom, Dario Salvucci, & Marieke van Vugt

15.30 – Break –

16.00 *Talks: Distraction & Fatigue*

Modeling mind-wandering: a tool to better understand distraction

Marieke van Vugt, Niels Taatgen, Jérôme Sackur, & Mikaël Bastian

Two Ways to Model the Effects of Sleep Fatigue on Cognition

Christopher Dancy, Frank Ritter, & Glenn Gunzelmann

A Model of Distraction using new Architectural Mechanisms to Manage Multiple Goals

Niels Taatgen, Ioanna Katidioti, Jelmer Borst, & Marieke van Vugt

17.00 End of Conference