

# Table of contents

Welcome address.....	1
Organization .....	2
Sponsors .....	5
Invited speakers .....	6
Program .....	10
Wednesday, 24 August 2011.....	10
Thursday, 25 August 2011 .....	12
Friday, 26 August 2011 .....	17
Saturday, 27 August 2011 .....	22
Venue.....	23
Getting there.....	23
Internet .....	24
Food .....	24
Author List.....	27

## Welcome address

Welcome to the first combined IEEE International Conference on Development and Learning and Epigenetic Robotics in Frankfurt am Main. These two conferences bring together a diverse group of researchers across the globe spanning computational, developmental, and brain sciences. While some of us are concerned primarily with using computational simulations and embodied robotics as *models* of development and learning processes in humans as part of a larger science of development that includes behavioral and neuroscientific studies of humans from infancy to adulthood, others of us emphasize the important role development may have in artificial agents *regardless* of how well such systems model anything that occurs in human beings, because such developmental processes may still be the best way to achieve intelligent, embodied agents, biological or not. As such, it is appropriate that ICDL-EpiRob 2011 is co-sponsored by the IEEE Computational Intelligence Society and the Cognitive Science Society, and has received generous financial contributions from the Frankfurt Institute for Advanced Studies, the Cognitive Interaction Technology Center of Excellence in Bielefeld, the European Union integrated projects ITALK and IM-CleVeR, Springer, and Microsoft Research. We are very grateful for these contributions.

ICDL-EpiRob is organized with a single presentation track, designed to encourage cross-disciplinary interaction and discussion. It features four keynote addresses from prominent experts, 25 full papers accepted for plenary presentation, 43 full papers accepted for poster presentation, and 30 extended abstracts. The creation of the extended abstracts sessions allowed us to be inclusive of work that is still in its early stages and lets researchers discuss these ideas in person, while still maintaining a high standard for the papers that are to be published in the archival proceedings.

In the spirit of the interdisciplinary nature of both ICDL and EpiRob, we ensured that each paper was assigned to program committee members (meta-reviewers) and reviewers from both natural intelligence and computational intelligence backgrounds. Authors then had an opportunity to provide rebuttals, which was then followed by a lively discussion among reviewers and meta-reviewers. The reviews were careful, extensive, and helpful to the authors, whatever the outcome of the review process for each paper. Final decisions were made by the Program Chairs, based on the reviews and suggestions of the meta-reviewers. Papers accepted for talks were selected from among a larger subset of the best reviewed papers to ensure broad coverage of the diverse topics represented at this conference.

In addition to the organizing and reviewing, ICDL-EpiRob has depended on the efforts of a large number of other people. Publicity Co-Chairs Matthew Schlesinger (North America), Yukie Nagai (Asia), and Pierre-Yves Oudeyer (Europe) helped publicize the conference. Publication Chair Francesco Nori assembled the Proceedings USB stick and worked with IEEE and Frontiers to publish and archive your excellent work. Webmasters Florian Brückner and Saul Hadman created the website and kept it up to date. At FIAS, Gaby Schmitz, Alexander Achenbach, Michael Lehmann and Eike Schädel worked tirelessly to make the conference work.

Gaby Schmitz also organized a great group of student volunteers, including Jantina Bolhuis, Pramod Chandrashekhariah, Daniel Krieg, Quan Wang, and Rachel Wu. Any attempt to list individual people inevitably omits someone who contributed mightily and deserves recognition (we mean you!), so thank you to that person especially.

Ian Fasel, Program Chair,  
Katharina Rohlfing, Program Chair,  
Angelo Cangelosi, General Chair,  
Jochen Triesch, General Chair

## Organization

### Organization committee

<b>General Chairs</b>	Angelo CANGELOSI (Plymouth, UK) Jochen TRIESCH (Frankfurt, Germany)
<b>Program Chairs</b>	Ian FASEL (Tucson, USA) Katharina ROHLFING (Bielefeld, Germany)
<b>Publications Chair</b>	Francesco NORI (IIT Genova, Italy)
<b>Publicity Chairs</b>	Pierre-Yves OUDEYER (Bordeaux, France) Matthew SCHELSINGER (Carbondale, USA) Yukie NAGAI (Osaka, Japan)
<b>Treasurer</b>	Gisbert JOCKENHOEFER (Frankfurt, Germany)
<b>Local Chair</b>	Gaby SCHMITZ (Frankfurt, Germany)

### Program Committee

- Minoru Asada, Osaka University, Japan
- Christian Balkenius, Lund University, Sweden
- Tony Belpaeme, University of Plymouth, UK
- Luc Berthouze, University of Sussex, UK
- Angelo Cangelosi, University of Plymouth, UK
- Eliana Colunga, University of Colorado, USA
- Rick Dale, University of Memphis, USA
- Kerstin Dautenhahn, University of Hertfordshire, UK
- Gedeon Deak, University of California San Diego, USA
- Kerstin Fischer, University of Southern Denmark
- Anna Fisher, Carnegie Mellon University, USA
- Christian Goerick, Honda Research Institute, Germany
- Lakshmi Gogate, Florida Gulf Coast University, USA
- Roderic Grupen, University of Massachusetts Amherst, USA

- Stephen Hart, Italian Institute of Technology, Genova
- Birger Johansson, Lund University, Sweden
- Susan Jones, Indiana University, USA
- Stefan Kopp, Bielefeld University, Germany
- Benjamin Kuipers, University of Michigan, USA
- Karl F. MacDorman, Indiana University, USA
- Giorgio Metta, University of Genova and IIT, Italy
- Takashi Minato, Osaka University, Japan
- Joseph Modayil, University of Alberta, Canada
- Clayton Morrison, University of Arizona, USA
- Yukie Nagai, Osaka University, Japan
- Lorenzo Natale, Italian Institute of Technology, Italy
- Tim Oates, University of Maryland Baltimore County
- Pierre-Yves Oudeyer, INRIA, France
- Katharina Rohlfing, Bielefeld University, Germany
- Erol Sahin, Middle East Technical University, Turkey
- Brian Scassellati, Yale University, USA
- Matthew Schlesinger, Southern Illinois University, USA
- Jürgen Schmidhuber, University of Lugano, Switzerland
- Alessandra Sciutti, IIT, Italy
- Jeff Siskind, Purdue University, USA
- Nathan Sprague, Kalamazoo College, USA
- Freek Stulp, University of Southern California, USA
- Jun Tani, RIKEN, Japan
- Juyang Weng, Michigan State University, USA
- Heiko Wersing, Honda Research Institute, Germany
- Britta Wrede, Bielefeld University, Germany
- Chen Yu, Indiana University, USA
- Hui Zhang, Indiana University, USA
- Zhengyou Zhang, Microsoft Research, USA

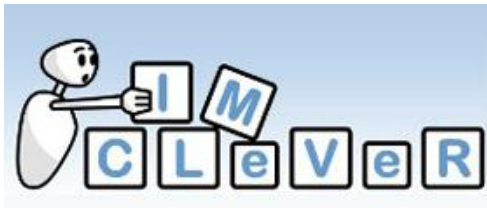
## List of Reviewers

- Axelsson, E.
- Baldassarre, G.
- Balkenius, C.
- Barbara, C.
- Barbu, A.
- Belpaeme, T.
- Bernardino, A.
- Berret, B.
- Berthouze, L.
- Brand, R.
- Butko, N.
- Cadavid, S.
- Calinon, S.
- Cangelosi, A.
- Choe, Y.
- Ciliberto, C.
- Cimiano, P.
- Clemente, I.A.
- Colunga, E.
- Dale, R.
- de Barbaro, K.
- Del Prete, A.
- Dittes, B.
- Dumas, L.
- Fasel, I.
- Fischer, K.
- Fisher, A.
- Foth, K.
- Gijsberts, A.
- Goerick, C.
- Gogate, L.
- Gori, M.
- Grupen, R.
- Hanheide, M.
- Hart, S.
- Hemion, N.
- Hewlett, D.
- Hufnagle, D.
- Ishihara, H.
- Park, J.J.
- Johansson, B.
- Jones, S.
- Joublin, F.
- Kalagher, H.
- Kalkan, S.
- Kaochar, T.
- Kloos, H.
- Konidaris, G.
- Kopp, S.
- Kuipers, B.
- Kuniyoshi, Y.
- Kuwabara, M.
- Larcombe, C.
- Levinson, S.
- Lewis, J.
- Liu, J.
- Lohse, M.
- Lopes, M.
- Metta, G.
- Modayil, J.
- Mori, H.
- Morrison, C.
- Mugan, J.
- Mühlig, M.
- Nagai, Y.
- Narayan, V.
- Narayanaswamy, S.
- Natale, L.
- Noeth, E.
- Nori, F.
- Oates, T.
- Ogino, M.
- Oudeyer, P.
- Oved, I.
- Oztop, E.
- Paikan, A.
- Patel, H.
- Pavlik, P.
- Perone, S.
- Perry, L.
- Rea, F.
- Rebguns, A.
- Rohlfing, K.
- Rohrer, B.
- Rolf, M.
- Ruvolo, P.
- Saegusa, R.
- Sahin, E.
- Saunders, J.
- Schillingmann, L.
- Schlesinger, M.
- Schmidhuber, J.
- Schmill, M.
- Sciutti, A.
- Sen, S.
- Shic, F.
- Sinapov, J.
- Sprague, N.
- Srinivas, P.
- Stober, J.
- Stout, A.
- Stoytchev, A.
- Strain, S.
- Street, S.
- Stulp, F.
- Susskind, J.
- Talbott, W.
- Tani, J.
- Thiessen, E.
- Tikhonoff, V.
- Torres Peralta, R.
- Trottier, L.
- Ugur, E.
- Vigorito, C.
- Vogt, P.
- Vollmer, A.
- Wachsmuth, S.
- Wagner, P.
- Walsh, T.
- Warlaumont, A.
- Weng, J.
- Wersing, H.
- Westermann, G.
- Whitehill, J.
- Wilkinson, N.
- Wrede, B.
- Xu, K.
- Yoshikawa, Y.
- Yu, C.
- Yurovsky, D.
- Zenzeri, J.
- Zhang, Z.

## Sponsors

Thanks to the following institutions and companies for their generous support of IEEE ICDL-EpiRob 2011 in Frankfurt am Main:

- Exzellenzcluster Cognitive Interaction Technology, Bielefeld University
- Cognitive Science Society
- IEEE Computational Intelligence Society
- EU ICT Integrated Project: Intrinsically Motivated Cumulative Learning Versatile Robots (IM- CLeVeR)
- EU ICT Integrated Project: Integration and Transfer of Action and Language Knowledge in Robotics (italk)
- Frankfurt Institute for Advanced Studies
- Microsoft Research
- Springer Science + Business Media



Springer



FIAS Frankfurt Institute for Advanced Studies



## Invited speakers

### **Andrew Barto, University of Massachusetts Amherst "Rethinking Intrinsic Motivation, Again"**

#### **Abstract**

The subject of intrinsic motivation has been receiving a lot of attention lately due to its relevance to development and cumulative learning. A healthy discussion has been underway among some of us interested in the prospect of building intrinsic motivation into artificial agents. What is intrinsic motivation? How does it differ from extrinsic motivation? Are there universal principles governing intrinsic motivation? Does it facilitate the acquisition of environment models, or is it for assembling repertoires of skills? Do we really want artificial agents to be intrinsically motivated? I have revised my answers to these questions several times since I began thinking about them and discussing them with others. In this talk I discuss some of the history and controversies surrounding the concept of intrinsic motivation in Psychology, the evolution of my own ideas about the subject, and my current view and its implications for contributing to effective cumulative learning.

#### **Short Biography**

Andrew Barto is Professor of Computer Science, University of Massachusetts, Amherst. He has been Chair of the UMass Department of Computer Science since 2007. He received his B.S. with distinction in mathematics from the University of Michigan in 1970, and his Ph.D. in Computer Science in 1975, also from the University of Michigan. He is Co-Director of the Autonomous Learning Laboratory and a core faculty member of the Neuroscience and Behavior Program of the University of Massachusetts. His research centers on learning in natural and artificial systems, and he has studied machine learning algorithms since 1977, contributing to the development of the computational theory and practice of reinforcement learning. He currently serves as an associate editor of Neural Computation and as a member of the editorial boards of Adaptive Behavior and Theoretical Computer Science-C: Natural Computing. Professor Barto is a Fellow of the American Association for the Advancement of Science, a Fellow and Senior Member of the IEEE, and a member of the American Association for Artificial Intelligence and the Society for Neuroscience. He received the 2004 IEEE Neural Network Society Pioneer Award for contributions to the field of reinforcement learning. He has published over one hundred papers or chapters in journals, books,

and conference and workshop proceedings. He is co-author with Richard Sutton of the book "Reinforcement Learning: An Introduction," MIT Press 1998.

**Lisa Oakes, University of California, Davis**  
**"Cognitive development, Learning, and Experience in Infancy"**

**Abstract**

The study of development in infancy is focused not only on *what* changes during infancy but also on understanding the mechanisms of those changes. For example, recent work has shown that changes in infants' manual exploratory abilities apparently influence their emerging perceptual development. These findings illustrate two important aspects of cognitive development in infancy. First, abilities do not develop in isolation. I have argued that an important challenge for researchers is to solve the *Humpty Dumpty problem*. That is, we must understand not only how individual skills and abilities develop, but also how they co-develop. Second, the study of the effect of emerging exploratory abilities on infants' perception illustrates the role of experience and learning on development. These two principles have guided the work in my lab, and we have explored how developing abilities work together to allow the emergence of new skills and understanding. We also have systematically explored the relation between specific types of experiences and infants' cognitions. In this talk I will discuss the challenges that face the field of infant cognition, and describe some of the advances we have made in our understanding, using examples from this work in our lab.

**Short Biography**

Lisa M. Oakes received her B.A. in Psychology at University of California, San Diego, in 1985 and her Ph.D. in Psychology at the University of Texas, Austin, in 1991. She began her first academic position as an Assistant Professor in the Department of Psychology at the University of Iowa in 1991, where she remained for 15 years and was promoted first to Associate Professor and later to Full Professor. In 2006, she moved to her present position as Professor of Psychology and Faculty Researcher at the Center for Mind and Brain at the University of California, Davis. Oakes studies many aspects of infant cognition, including categorization, visual short-term memory, and visual perception. She is currently Associate Editor for the journal *Infancy*. Oakes has published three books and



many research articles. Her work is funded by the National Institutes of Health and the National Science Foundation.

## **Erin Schuman, Max Planck Institute for Brain Research, Frankfurt "Neuronal Plasticity and Memory in Rodents and Humans"**

### **Abstract**

Neurons in the medial temporal lobe of mammals are critically involved in the acquisition and retention of episodic memories - memories for facts and events. I will describe experiments in rodents and humans that examine the contribution of medial temporal lobe neurons in the detection of novel vs. familiar stimuli as well as the encoding and retention of episodic memories.

### **Short Biography**

Erin Schuman is a neurobiologist who conducts research into fundamental brain mechanisms, exploring questions as to how the long-term storage of memory works and how synapses change in order to generate a memory impression and store sensory impressions. Erin Schuman was born in the USA in 1963. She completed her bachelor's degree in psychology at the University of Southern California in Los Angeles in 1985 and her PhD in Neuroscience at Princeton University in 1990. She conducted postdoctoral work in the Department of Molecular and Cellular Physiology at Stanford University. In 1993, she was hired as an Assistant Professor of Biology at the California Institute of Technology; she was promoted to Associate Professor in 1999 and Full Professor in 2004. In 1997 she was also appointed as an Investigator of the Howard Hughes Medical Institute (HHMI). In 2009, she was recruited by the Max Planck Society to be a founding director of the new Max Planck Institute for Brain Research- scheduled to open in Riedberg (Frankfurt) in May 2012. Erin Schuman has been awarded numerous prizes and grants, including an Alfred P. Sloan Foundation award in 1994, the Beckman Young Investigator Award in 1996 and was honored as an Emerging Scholar by the American Association of University Women in 1995.

**Michael Tomasello, Max Planck Institute for Evolutionary  
Anthropology, Leipzig  
"Cooperation and Human Cognition"**

**Abstract**

Great apes cognitively represent and reason (make inferences) about the world. Humans, in addition, represent the world propositionally and conceptually (perceptively), and they reason about it recursively and reflectively. The Shared Intentionality Hypothesis posits that these uniquely human forms of cognitive representation and reasoning emerged evolutionarily as cognitive adaptations for dealing with a distinctive form of social life, specifically, one in which individuals had to coordinate their intentional states with others in cooperative, and ultimately cultural, activities. Within these cooperative activities, early humans created shared realities (joint attention, common ground), which then enabled them to direct the attention and imagination of one another in relevant ways in acts of cooperative, and ultimately conventional, communication. Learning to cooperate and communicate within a cultural group during ontogeny creates uniquely human propositional-conceptual-reflective cognition.

**Short Biography**

Co-Director, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany. Research interests focus on processes of social cognition, social learning, and communication/language in human children and great apes. Books include *First Verbs* (Cambridge University Press, 1992); *Primate Cognition* (Oxford University Press, 1997); *The Cultural Origins of Human Cognition* (Harvard University Press, 1999); *Constructing a Language: A Usage-Based Theory of Language Acquisition* (Harvard University Press, 2003); *Origins of Human Communication* (MIT Press, 2008), and *Why We Cooperate* (MIT Press, 2009).

## Program

### **Wednesday, 24 August 2011 - Tutorials and Special Sessions**

8:00: *Registration opens*

9:00 - 13:00 **Special Sessions and Tutorials**

<b>FIZ ConferenceLab</b>	<b>FIAS</b>
<p>9:00 - 11:00 <i>Special Session</i></p> <p><b>How can human scaffolding support robots to learn?</b></p> <p>K S Lohan, <i>Bielefeld University</i> Y Nagai, <i>Osaka University</i></p>	<p>9:00 - 13:00 <i>Tutorial</i></p> <p><b>Computational brain-mind: development, architecture, areas, space, time, and modulation</b></p> <p>J Weng, <i>Michigan State University</i></p>
<p>11:00 - 13:00 <i>Tutorial</i></p> <p><b>Analyzing micro-level multimodal behaviors in child-parent and human-robot interactions</b></p> <p>C Yu, <i>Indiana University</i> L B Smith, <i>Indiana University</i></p>	

13:00 - 14:30 *Lunch*

14:30 - 16:30 **Special Sessions**

FIZ ConferenceLab	FIAS
<p>14:30 - 16:30</p> <p><b>Goal directed behaviour and intrinsic motivations: New experimental paradigms and robotic models</b></p> <p>G Baldassarre, V Fiore, F Mannella, V Sperati, D Caligiore, M Mirolli, <i>ISTC-CNR, Rome</i></p> <p>K Kenward, <i>Uppsala Universitet</i></p> <p>D Formica, F Taffoni, F Keller, E Guglielmelli, <i>Universtà Campus Biomedico</i></p>	<p>14:30 - 16:30</p> <p><b>From sounds to words: Modeling cognitive architecture for the speech sound acquisition</b></p> <p>I S Howard, <i>University of Cambridge</i> P Messum, <i>University College London</i> H Van hamme, <i>Katholieke Universiteit Leuven</i> Y Sato, C Lyon, H Lehmann, C.Nehaniv, <i>University of Hertfordshire.</i></p>

16:30-17:00 Coffee Break at FIZ LabLounge

17:00-19:00 **Special Sessions**

FIZ ConferenceLab	FIAS
<p>17:00-19:00</p> <p><b>Advances in developmental robotics of action and language learning</b></p> <p>A Cangelosi, <i>University of Plymouth</i> G Metta, <i>Italian Institute of Technology</i> K Fischer, <i>University of Southern Denmark</i> S Nolfi, <i>ISTC-CNR Rome</i> C Nehaniv, <i>Hertfordshire University</i> K Rohlfing, <i>Bielefeld University</i></p>	<p>17:00-19:00</p> <p><b>Social gaze: From human-human to human-robot interaction</b></p> <p>F Broz, <i>University of Hertfordshire</i> H Lehmann, <i>University of Hertfordshire</i> F Rossano, <i>Max-Planck-Institute for Evolutionary Anthropology</i> L Schilbach, <i>Max-Planck-Institute for Neurological Research, University of Cologne</i></p>

19:00 Reception at FIZ LabLounge

## **Thursday, 25 August 2011**

8:30-9:30 Keynote: **Erin Schuman**

9:30-10:00 *Coffee Break*

- 10:00      Increasing spatial competition enhances visual prediction learning  
                 M Schlesinger, *Southern Illinois University*; D Amso, *Brown University*; S Johnson, *University of California Los Angeles*
- 10:20      The two-dimensional organization of behavior  
                 M Ring, T Schaul, J Schmidhuber, *IDSIA*
- 10:40      A measure of good motor actions for active visual perception  
                 J Ruesch, R Ferreira, A Bernardino, *Instituto Superior Tecnico de Lisboa*

11:00-11:30 *Coffee Break*

- 11:30      Emergence of mirror neuron system: Immature vision leads to self-other correspondence  
                 Y Nagai, Y Kawai; M Asada, *Osaka University*
- 11:50      Learning to react to abstractions: Accumulating adaptations in a humanoid embodiment  
                 C Larcombe, A Morse, A Cangelosi, *University of Plymouth*

12:10-13:00 **Poster Spotlights I**

- T1          Information theoretic reward shaping for curiosity driven learning in POMDPs  
                 N Mafi, F Abtahi, I Fasel, *University of Arizona*
- T2          Intrinsically motivated neuroevolution for vision-based reinforcement learning  
                 G Cuccu, M Luciw, J Schmidhuber, F Gomez, *IDSIA*
- T3          Artificial curiosity with planning for autonomous perceptual and cognitive development  
                 M Luciw, V Graziano, M Ring, J Schmidhuber, *IDSIA*

- T4 The interaction of maturational constraints and intrinsic motivations in active motor development  
A Baranes, P-Y Oudeyer, *INRIA Bordeaux*
- T5 Emerging social awareness: exploring intrinsic motivation in multiagent learning  
P Sequeira, F Melo, R Prada, A Paiva, *IST/INESC-ID Lisbon*
- T6 A generative model for developmental understanding of visuomotor experience  
K Noda, K Kawamoto, T Hasuo, K Sabe, *Sony Corporation*
- T7 A competitive mechanism for self-organized learning of sensorimotor mappings  
N Hemion, *Bielefeld University*; F Joublin, *Honda Research Institute Europe*; K Rohlfing, *Bielefeld University*
- T8 Joint development of disparity tuning and vergence control  
W Sun, B Shi, *HKUST*
- T9 Reward-driven learning of sensorimotor laws and visual features  
J Kleesiek, *University Medical Center Hamburg-Eppendorf*; C Weber, S Wermter, *University of Hamburg*; A Engel, *University Medical Center Hamburg-Eppendorf*
- T10 Modelling early infant walking: testing a generic CPG architecture on the NAO humanoid  
G Lee, R Lowe, T Ziemke, *University of Skövde*
- T11 Learning geometry from sensorimotor experience  
J Stober, *UTCS*; R Miikkulainen, *University of Texas at Austin*; B Kuipers, *University of Michigan*
- T12 Developmental robotics architecture for active vision and reaching  
H Huelse, M Lee, S McBride, *Aberystwyth University*
- T13 Early-stage vision of composite scenes for spatial learning and navigation  
O Georgeon, *Université de Lyon*; J Marshall, *Sarah Lawrence College*; P-Y Ronot, *Université Lyon 1*
- T14 What a successful grasp tells about the success chances of grasps in its vicinity  
L Bodenhausen, R Detry, J Piater, N Krüger, *University of Southern Denmark*
- T15 Towards using prosody to scaffold lexical meaning in robots  
J Saunders, C Nehaniv, H Lehmann, Y Sato, *University of Hertfordshire*

- T16      Bootstrapping word learning: a perception driven semantics-first approach  
             A Mukerjee, N Joshi, P Mudgal, S V P Gopi Srinath, *IITK*
- T17      Phonetic analysis of a computational model for vocabulary acquisition from auditory inputs  
             H Van hamme, *K.U.Leuven*
- T18      A biologically inspired approach for interactive learning of categories  
             S Kirstein, H Wersing, *Honda Research Institute Europe*
- T19      Building subjective spatial perception based on sensor space integration for motion generation  
             Y Kobayashi, E Kurita, *Tokyo University of Agriculture and Technology*; M Gouko, *Tohoku Gakuin University*

### *13:00-14:30 Lunch*

- 14:30      The development of shared meaning within different embodiments  
             J De Greeff, T Belpaeme, *University of Plymouth*
- 14:50      It's the child's body: the role of toddler and parent in selecting toddler's visual experience  
             T Xu, C Yu, L B Smith, *Indiana University Bloomington*
- 15:10      Sequential pattern mining of multimodal data streams in social interactions  
             D Fricker, H Zhang, C Yu, *Indiana University Bloomington*

### *15:30-16:00 Coffee Break*

- 16:00      Reinforcement learning of impedance control in stochastic force fields  
             F Stulp, J Buchli; A Ellmer; M Mistry; E Theodorou; S Schaal;  
             *University of Southern California*
- 16:20      Trying anyways: how ignoring the errors may help in learning new skills  
             B Grzyb, *Jaume I University*; J Boedecker, M Asada, *Osaka University*; A del Pobil, *Jaume I University*; L B Smith, *Indiana University*

## 16:40-17:45 Poster Spotlights II

- T20 Learning regions for building a world model from clusters in probability distributions  
W Slowinski, F Guerin, *University of Aberdeen*
- T21 Emergence of higher-order transitivity across development: the importance of local task difficulty  
H Kloos, *University of Cincinnati*
- T22 PSchema: A developmental schema learning framework for embodied agents  
M Sheldon, M Lee, *Aberystwyth University*
- T23 Making a robotic scene representation accessible to feature and label queries  
S Zibner, C Faubel, G Schöner, *Institut für Neuroinformatik*
- T24 Learning of audiovisual integration  
R Yan, *Bielefeld University*; T Rodemann, *Honda Research Institute Europe*; B Wrede, *Bielefeld University*
- T25 Towards grounding concepts for transfer in goal learning from demonstration  
C Chao, M Cakmak, A Thomaz, *Georgia Tech*
- T26 Uncertain semantics, representation nuisances, and necessary invariance properties of bootstrapping agents  
A Censi, R Murray, *California Institute of Technology*
- T27 Development of a connection matrix for productive grounded cognition  
F Van der Velde, *Leiden University*; M de Kamps, *University of Leeds*
- T28 Ebbinghaus simulated: Just do it 200 times  
C Lange-Kuettner, *London Metropolitan University*
- T29 Ignorance is bliss: a complexity perspective on adapting reactive architectures  
H Wareham, *Memorial University of Newfoundland*; J Kwisthout, P Haselager, I van Rooij, *Radboud University Nijmegen*
- T30 On-Line learning and planning in a pick-and-place task demonstrated through body manipulation.  
A De Rengervé, J Hirel, P Andry, M Quoy, P Gaussier, *ETIS*
- T31 Towards simultaneous categorization and mapping among multimodalities based on subjective consistency  
Y Sasamoto, Y Yoshikawa, M Asada, *Osaka University*



- T32 Towards incremental learning of task-dependent action sequences using probabilistic parsing  
K Lee, Y Demiris, *Imperial College London*
- T33 Ego-centric and allo-centric abstraction in self-organized hierarchical neural networks  
M Maniadakis, *FORTH*; J Tani, *RIKEN*; P Trahanias, *FORTH*
- T34 Familiarity-to-novelty shift driven by learning: a conceptual and computational model  
P Chandrashekhariah, Q Wang, G Spina, *FIAS Frankfurt*
- T35 Hierarchical reinforcement learning and central pattern generators for modeling the development of rhythmic manipulation skills  
A L Ciancio, L Zollo, E Guglielmelli, *Università Campus Bio-Medico Roma*; D Caligiore, G Baldassarre, *ISTC-CNR*
- T36 Robust central pattern generators for embodied hierarchical reinforcement learning  
M Snel, S Whiteson, Y Kuniyoshi, *University of Amsterdam*
- T37 A neural-dynamic architecture for behavioral organization of an embodied agent  
Y Sandamirskaya, M Richter, G Schöner, *INI Ruhr-Universität Bochum*

**17:45-19:45 Poster Session I**

## **Friday, 26 August 2011**

8:30-9:30 Keynote: **Andrew Barto**

9:30-10:00 *Coffee Break*

- 10:00 Towards a definition of intrinsic motivations: A biological perspective  
G Baldassarre, *ISTC-CNR Rome*
- 10:20 Intrinsic activity: From motor babbling to play  
M Lee, *Aberystwyth University*
- 10:40 Online goal babbling for rapid bootstrapping of inverse models in high dimensions  
M Rolf, J Steil, M Gienger, *Bielefeld University*
- 11:00 Scalable reinforcement learning through hierarchical decompositions for weakly-coupled problems  
H Toutounji, C Rothkopf, J Triesch, *FIAS Frankfurt*

11:20 *Short Break*

11:35-12:25 **Poster Spotlights III**

- F1 Modelling the face-to-face effect: Sensory population dynamics and active vision can contribute to perception of social context  
N Wilkinson, *Instituto Italiano di Tecnologia*; G Gredeback, *Uppsala University*; G Metta, *Instituto Italiano di Tecnologia*
- F2 People-aware navigation for goal-oriented behavior involving a human partner  
D Feil-Seifer, M Mataric, *University Southern California*
- F3 Robots as social mediators for children with autism: A preliminary analysis comparing two different robotic platforms  
I Iacono, *University of Siena*; H Lehmann, *University of Hertfordshire*; P Marti, *University of Siena*; B Robins, K Dautenhahn, *University of Hertfordshire*

- F4 Is talking to a simulated robot like talking to a child?  
K Fischer, K Foth, *University of Southern Denmark*; K Rohlffing, B Wrede, *Bielefeld University*
- F5 Simultaneous acquisition of task and feedback models  
M Lopes, T Cederborg, P-Y Oudeyer, *INRIA Bordeaux*
- F6 Preschoolers' learning about buoyancy: Does it help to give away the answer?  
H Baker, A Hausmann, H Kloos, *University of Cincinnati*; A Fisher, *Carnegie Mellon University*
- F7 From Affordances to situated affordances in robotics - Why context is important  
M Kammer, T Schack, M Tscherepanow, *Bielefeld University*; Y Nagai, *Osaka University*
- F8 Can state-of-the-art saliency systems model infant gazing behavior in tutoring situations?  
T N Vikram, K S Lohan, M Tscherepanow, K Rohlffing, B Wrede, *Bielefeld University*
- F9 Mutual gaze: Implications for human-robot interaction  
F Broz, H Lehmann, C Nehaniv, K Dautenhahn, *University of Hertfordshire*
- F10 From field of view to field of reach - could pointing emerge from the development of grasping?  
V Hafner, G Schillaci, *Humboldt University Berlin*
- F11 Multi-modal anchoring in infants and artificial systems  
S Fischer, D Schulze, P Borggrebe, M Piefke, S Wachsmuth, K Rohlffing, *Bielefeld University*
- F12 A developmental model of initiating joint attention through constructing state space  
T Nakano, M Asada, S Fujiki, Y Yoshikawa, *Osaka University*
- F13 What does learning to 'draw a circle' have to do with driving, cycling, unwinding and screwing?  
V Mohan, P Morasso, G Metta, *Italian Institute of Technology*
- F14 Motionese influences infants' imitation of goal-directed action: the effect of emotional information  
H Fukuyama, *Kyoto University*; M Myowa-Yamakoshi, *Japan Science and Technology Agency*
- F15 Tool-use learning mechanisms at the end of the second year in human infants  
L Rat-Fischer, J K O'Regan, J Fagard, *CNRS - Université Paris Descartes*

- F16 Connectionist model of action learning and naming  
I Farkas, *Comenius University Slovakia*
- F17 Haptic computing, virtual trees and visual motion epistemics: A preliminary brief  
C F Nourani, *CIS USA*
- F18 Multiple time scales recurrent neural network for complex action acquisition  
M Peniak, D Marocco, *University of Plymouth*; J Tani, Y Yamashita, RIKEN; K Fischer, *University of Southern Denmark*; A Cangelosi, *University of Plymouth*

*12:25-14:00 Lunch*

14:00-15:00 Keynote: **Michael Tomasello**

*15:00-15:30 Coffee Break*

- 15:30 The power of words  
A Morse, P Baxter, T Belpaeme, *University of Plymouth*; L B Smith, *University of Indiana*; A Cangelosi, *University of Plymouth*
- 15:50 Measuring word learning performance in computational models and infants  
C Bergmann, L Boves, L ten Bosch, *Radboud University Nijmegen*
- 16:10 Teaching and executing verb phrases  
D Hewlett, T Walsh, P Cohen, *University of Arizona*

*16:30-16:45 short break*

## 16:45-17:35 Poster Spotlights IV

- F19 Mechanisms leading to tool use: A longitudinal study in human infants  
J K O'Regan, L Rat-Fischer, J Fagard, *CNRS - Université Paris Descartes*
- F20 Rethinking motor development and learning  
J Artigas, *University of Miami*; T Wu, P Ruvolo, *University of California, San Diego*; W Mattson, *University of Miami*; J Movellan, *University of California, San Diego*; D Messinger, *University of Miami*
- F21 Modeling maturational constraints for learning biped humanoid locomotion  
M Lapeyre, *INRIA Bordeaux*; O Ly, *University Bordeaux I*
- F22 Deep belief nets as function approximators for reinforcement learning  
F Abtahi, I Fasel, *University of Arizona*
- F23 Influence of the reward on the abstractions  
I Mikhailova, *Honda Research Institute Europe*
- F24 From symbol grounding to socially shared embodied language knowledge  
A Zeschel, *University of Southern Denmark*; E. Tuci, *Aberystwyth University*
- F25 A computational model for cued infant learning  
T Hannagan, *CNRS and Aix-Marseille University*; R Wu, *Birkbeck University of London*; S Hidaka, *JAIST*; C Yu, *Indiana University*
- F26 Towards self-organized online extraction of invariances using a hierarchy of multiple-timescale reservoirs  
J Boedecker, M Asada, *Osaka University*
- F27 Unsupervised learning of simultaneous motor primitives through imitation  
O Mangin & P-Y Oudeyer, *INRIA Bordeaux*
- F28 A developmental agent for learning features, environment models, and general robotics tasks  
B Rohrer, *Sandia National Laboratories*
- F29 Humanoid robots and cognitive systems research: An epistemological case study based on the iCub  
B Huang, J Bryson, J Leake, *University of Bath*
- F30 Cognitive and emotional interactions between autistic child, mobile robot and therapist: a case report  
I Giannopulu, *EPP-ICP*
- F31 Intrinsically motivated goal space creation for autonomous goal-directed exploration in high-dimensional unbounded sensorimotor spaces  
F Benureau, P-Y Oudeyer, *INRIA Bordeaux*

- F32 Compression progress-based curiosity drive for developmental learning  
H Ngo, M Ring, J Schmidhuber, *IDSIA*
- F33 How much raw sounds can do for word learning: Learning by 'reparing'  
in human robot interaction  
Y Sato, *University of Hertfordshire*
- F34 Acoustic packaging and the learning of words  
L Schillingmann, P Wagner, C Munier, B Wrede, K Rohlfing, *Bielefeld  
University*
- F35 Imitating operations on internal cognitive structures for language  
aquisition  
T Cederborg, P-Y Oudeyer, *INRIA Bordeaux*
- F36 Informational coupling in social interaction as a goodness of  
communication  
S Hidaka, *JAIST*
- F37 Learning a reachable space map in a gaze centered reference frame  
L Jamone, M Destephe, *Waseda University*; L Natale, *Italian Institute  
of Technology*; K Hashimoto, A Takanishi, *Waseda University*; G  
Sandini, *Italian Institute of Technology*
- F38 A neurodynamic architecture for the autonomous control of a spatial  
language system  
S Schneegans, Y Sandamirskaya, *Ruhr-Universität Bochum*

**17:35-19:30 Poster Session II**

*20:00 Dinner at FIAS (for registered participants)*

## **Saturday, 27 August 2011**

8:30-9:30      Keynote: **Lisa Oakes**

9:30-10:00    *Coffee Break*

10:00      Unsupervised discovery of phoneme boundaries in multi-speaker continuous speech

T Armstrong, S Antetomaso, *Wheaton College*

10:20      Development of object manipulation through self-exploratory visuomotor experience

K Kawamoto, K Noda, *Sony Corporation*

10:40      An unsupervised algorithm for the induction of constructions

J Gaspers, P Cimiano, S Griffiths, B Wrede, *Bielefeld University*

11:00      A cognitive basis for theories of intrinsic motivation

N Srivastava, K Kapoor, P Schrater, *University of Minnesota*  
(presented by C Rothkopf, *FIAS Frankfurt*)

11:20-11:50   *Coffee Break*

11:50      Bootstrapping intrinsically motivated learning with human demonstration

S M Nguyen, A Baranes, P-Y Oudeyer, *INRIA Bordeaux*

12:10      Contingency allows the robot to spot the tutor and to learn from interaction

K S Lohan, K Pitsch, K Rohlfing, *Bielefeld University*; K Fischer, *University of Southern Denmark*; H Lehmann, J Saunders, C Nehaniv, *University of Hertfordshire*; B Wrede, *Bielefeld University*

12:30      Development of joint attention and social referencing

S Boucenna, P Gaussier, L Hafemeister, *ETIS, CNRS, ENSEA, UCP*

12:50      Realistic child robot "affetto" for understanding the caregiver-child attachment relationship that guides the child development

H Ishihara, Y Yoshikawa, M Asada, *Osaka University*

13:10 *Lunch*

14:00 *Awards and ICDL-EpiRob General Meeting*

## Venue

The conference is held in the FIZ ConferenceLab, the central element of the research and business landscape of FIZ Frankfurt Biotechnology Innovation Center.

FIZ ConferenceLab  
Altenhöferallee 3  
D-60438 Frankfurt  
Phone: +49(0)69 800 865 50  
Fax: +49(0)69 800 865 51  
e-mail: [info@fiz-cl.de](mailto:info@fiz-cl.de)  
[www.fiz-conferencelab.de](http://www.fiz-conferencelab.de)

FIZ is located in Science City Frankfurt Riedberg in the North of Frankfurt and is surrounded by the scientific departments of the Johann Wolfgang Goethe University ("Campus Riedberg"), two Max Planck Institutes, and other fundamental research facilities such as the Frankfurt Institute for Advanced Studies (FIAS).

This fast developing area will soon be home to 15.000 inhabitants and 8.000 students. It is one of the biggest development projects of this kind in Germany. The area boasts panoramic views of the Taunus mountain to the North and the skyline of Frankfurt to the South. The central part of this area is host to a shopping mall, cafes and restaurants, a park and green spaces. Furthermore transportation connections are excellent with access to two major motorways and a subway station (U-Bahn) "Campus Riedberg".

## Getting there

The closest subway station (U-Bahn) is "Campus Riedberg" (lines U8 and U9), which is a 2 minute walk from the conference building. The nearest bus stop is "Max-Planck-Institute/FIZ", served by bus line 29 and 251, just a few steps from the FIZ building.

The way from station "Riedberg" to the city center (station "Hauptwache", line U8) takes 20 minutes.

The public transport in Frankfurt is managed by Rhein-Main-Verkehrsverbund whose multilingual website ([www.rmv.de](http://www.rmv.de)) has a very useful route planner to organize your trips in and around Frankfurt. Tickets must be bought from ticket machines prior to the trip. When going by bus, you can also buy them from the bus driver when boarding, however, this alternative is not available in the subway.



## Internet

### Instructions for WLAN access FIZ ConferenceLab

1. Please select your wireless network management program to choose from the list of available networks.
2. Select "FIZ-WLAN-Public" and click on "Connect". Depending on your operating system, please answer the confirmation prompt with "Yes".

Hint: the network access is not externally encrypted (no separate WEP / WPA2 or other encryption, to be recognized by the missing lock and the missing confirmation prompt). A password-protected authentication process will have to be passed in your internet browser. However, IT security policies of some corporate notebooks do not admit unencrypted wireless connections; please contact us in this case.

As soon as the connection is established, you will see a confirmation screen.

3. Start the internet browser of your choice (e.g. Internet Explorer or Firefox).
4. When you open your home or start page (in some cases, you have to open a new tab or reload the page), the window for the network authentication process appears.
5. Please use as user name "Guest" and as password "Uracil" (without "") – then click "Login".

Now you are connected to the Internet and you can use the Internet up to 24 hours with all standard features (e.g. also for VPN connections, e-mailing etc.)

Please log off properly after leaving the event.

In case of questions please contact the reception desk. Support from the FIZ IT will be requested immediately.

### Instructions for WLAN access at FIAS

1. Please select your wireless network management program to choose from the list of available networks.
2. Select "FIAS" as your wireless network.
3. When asked for a wireless password, enter the given password and proceed.

Password will be disclosed on request.

## Food

A welcome reception snack will be served in the **FIZ LabLounge** on Wednesday, August 24 at around 7:00 pm. All coffee breaks will be organized in the foyer of the **FIZ ConferenceLab** and in the **FIZ LabLounge**.

The banquet dinner will be served in the **Faculty Club of the Frankfurt Institute for Advanced Studies** (Ruth-Moufang-Str. 1, 4th floor) on Friday, August 26 at around 8:00 pm.

Lunch will be available in the **FIZ LabRestaurant**. You may also explore the Campus Riedberg and try the **Mensa Pi x Gaumen** located at the ground level in the Biozentrum (Max-von-Laue-Str. 9; opening hours Mon – Fri 07:30 am – 3:00

pm). On your way there you will be crossing the **Stehcafé Alfredo** in the same building (opening hours Mon – Fri 09:30 am – 3:30 pm). Or you step into the Physics building (Max-von-Laue-Str. 1) and help yourself in the **Café Physik** (opening hours Mon – Fri 08:00 am – 4:00 pm).

Visitors can also enjoy several restaurants located within walking distance of the FIZ ConferenceLab. Most of them are listed below and shown on a map overleaf. Alternatively, visitors may travel to the **Nordwestzentrum** (U-Bahn station "Campus Riedberg" taking the direction "Ginnheim", step out at "Nordwestzentrum"; 6 minutes) for a wide choice of eateries.

**Park Avenue**

Riedbergplatz 3  
 Fon: +49 (0)69 200 212 23  
<http://www.park-avenue-frankfurt.de/>

**Jimmel’s Kitchen - Healthy Asian Food**

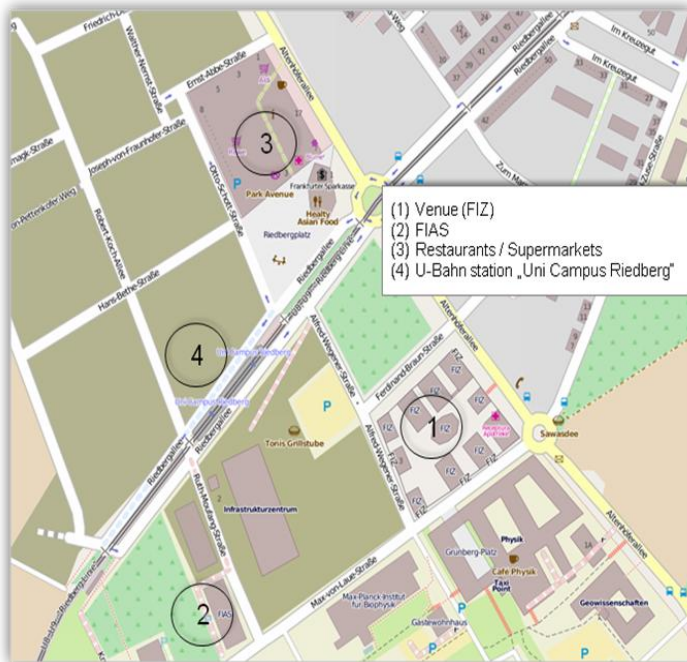
Riedbergplatz 1  
 Fon: +49 (0)69 95 15 50 88

**Isolabella – Ristorante Pizzeria**

Altenhöferallee 132  
 Fon: +49 (0)69 90 50 98 23

**Zum lahmen Esel – typical Frankfurt Restaurant**

Krautgartenweg 1  
 Fon: +49 (0)69 57 39 74  
<http://www.lahmer-esel.de/>



**Map 1: Restaurants near the venue**



**Map 2: Food courts of Campus Riedberg at a glance**

Both maps: © OpenStreetMap Contributors, CC-BY-SA  
<http://openstreetmap.de> and <http://creativecommons.org/licenses/by-sa/2.0>

## Author List

Abtahi, F .....	12, 20	Farkas, I .....	19
Amso, D .....	12	Fasel, I .....	12, 20
Andry, P .....	15	Faubel, C .....	15
Antetomaso, S .....	22	Feil-Seifer, D .....	17
Armstrong, T .....	22	Ferreira, R .....	12
Artigas, J .....	20	Fiore, V .....	11
Asada, M .....	12, 14, 15, 18, 20, 22	Fischer, K .....	11, 18, 19, 22
Baker, H .....	18	Fischer, S .....	18
Baldassarre, G .....	11, 16, 17	Fisher, A .....	18
Baranes, A .....	13, 22	Formica, D .....	11
Barto, A .....	6, 17	Foth, K .....	18
Baxter, P .....	19	Fricker, D .....	14
Belpaeme, T .....	14, 19	Fujiki, S .....	18
Benureau, F .....	20	Fukuyama, H .....	18
Bergmann, C .....	19	Gaspers, J .....	22
Bernardino, A .....	12	Gaussier, P .....	15, 22
Bodenhagen, L .....	13	Georgeon, O .....	13
Boedecker, J .....	14, 20	Giannopulu, I .....	20
Borggrebe, P .....	18	Gienger, M .....	17
Boucenna, S .....	22	Gomez, F .....	12
Boves, L .....	19	Gopi Srinath, S V P .....	14
Broz, F .....	11, 18	Graziano, V .....	12
Bryson, J .....	20	Gredeback, G .....	17
Buchli, J .....	14	Griffiths, S .....	22
Cakmak, M .....	15	Grzyb, B .....	14
Caligiore, D .....	11, 16	Guerin, F .....	15
Cangelosi, A .....	11, 12, 19	Guglielmelli, E .....	11, 16
Cederborg, T .....	18, 21	Hafemeister, L .....	22
Censi, A .....	15	Hafner, V .....	18
Chandrashekhariah, P .....	16	Hannagan, T .....	20
Chao, C .....	15	Haselager, P .....	15
Ciancio, A L .....	16	Hashimoto, K .....	21
Cimiano, P .....	22	Hasuo, T .....	13
Cohen, P .....	19	Hausmann, A .....	18
Cuccu, G .....	12	Hemion, N .....	13
Dautenhahn, K .....	17, 18	Hewlett, D .....	19
De Greeff, J .....	14	Hidaka, S .....	20, 21
de Kamps, M .....	15	Hirel, J .....	15
de Rengervé, A .....	15	Howard, I. S. ....	11
del Pobil, A .....	14	Huang, B .....	20
Demiris, Y .....	16	Huelse, H .....	13
Destephe, M .....	21	Iacono, I .....	17
Detry, R .....	13	Ishihara, H .....	22
Ellmer, A .....	14	Jamone, L .....	21
Engel, A .....	13	Johnson, S .....	12
Fagard, J .....	18, 20	Joshi, N .....	14

Joublin, F .....	13	Morasso, P .....	18
Kammer, M .....	18	Morse, A .....	12, 19
Kapoor, K.....	22	Movellan, J .....	20
Kawai, Y.....	12	Mudgal, P .....	14
Kawamoto, K .....	13, 22	Mukerjee, A .....	14
Keller, F.....	11	Munier, C.....	21
Kenward, K.....	11	Murray, R .....	15
Kirstein, S .....	14	Myowa-Yamakoshi, M.....	18
Kleesiek, J .....	13	Nagai, Y .....	10, 12, 18
Kloos, H.....	15, 18	Nakano, T.....	18
Kobayashi, Y.....	14	Natale, L.....	21
Krüger, N .....	13	Nehaniv, C. ....	11, 13, 18, 22
Kuipers, B .....	13	Ngo, H.....	21
Kuniyoshi, Y.....	16	Nguyen, S M .....	22
Kurita, E.....	14	Noda, K.....	13, 22
Kwisthout, J .....	15	Nolfi, S.....	11
Lange-Kuettner, C .....	15	Nourani, C F.....	19
Lapeyre, M.....	20	Oakes, L.....	7, 22
Larcombe, C .....	12	O'Regan, J K.....	18, 20
Leake, J.....	20	Oudeyer, P-Y.....	13, 18, 20, 21, 22
Lee, G.....	13	Paiva, A.....	13
Lee, K.....	16	Peniak, M.....	19
Lee, M.....	13, 15, 17	Piater, J.....	13
Lehmann, H.....	11, 13, 17, 18, 22	Piefke, M .....	18
Lohan, K S.....	10, 22	Pitsch, K.....	22
Lopes, M.....	18	Prada, R.....	13
Lowe, R.....	13	Quoy, M.....	15
Luciw, M.....	12	Rat-Fischer, L.....	18, 20
Ly, O .....	20	Richter, M.....	16
Lyon, C.....	11	Ring, M.....	12, 21
Mafi, N .....	12	Robins, B.....	17
Mangin, O .....	20	Rodemann, T.....	15
Maniadakis, M.....	16	Rohlfing, K.....	11, 13, 18, 21, 22
Mannella, F.....	11	Rohrer, B.....	20
Marocco, D .....	19	Rolf, M.....	17
Marshall, J .....	13	Ronot, P-Y.....	13
Marti, P .....	17	Rossano, R. ....	11
Mataric, M.....	17	Rothkopf, C .....	17, 22
Mattson, W.....	20	Ruesch, J .....	12
McBride, S .....	13	Ruvolo, P.....	20
Melo, F.....	13	Sabe, K .....	13
Messinger, D.....	20	Sandamirskaya, Y .....	16, 21
Messum, P.....	11	Sandini, G .....	21
Metta, G.....	11, 17, 18	Sasamoto, Y.....	15
Miikkulainen, R .....	13	Sato, Y. ....	11, 13, 21
Mikhailova, I.....	20	Saunders, J .....	13, 22
Mirolli, M. ....	11	Schaal, S.....	14
Mistry, M.....	14	Schack, T .....	18
Mohan, V .....	18	Schaul, T .....	12

Schilbach, L .....	11	Trahanias, P.....	16
Schillaci, G.....	18	Triesch, J.....	17
Schillingmann, L .....	21	Tscherepanow, M.....	18
Schlesinger, M.....	12	van der Velde, F.....	15
Schmidhuber, J.....	12, 21	Van hamme, H .....	11, 14
Schneegans, S .....	21	van Rooij, I .....	15
Schöner, G.....	15, 16	Vikram, T N .....	18
Schrater, P.....	22	Wachsmuth, S.....	18
Schulze, D .....	18	Wagner, P .....	21
Schuman, E.....	8, 12	Walsh, T .....	19
Sequeira, P.....	13	Wang, Q.....	16
Sheldon, M.....	15	Wareham, H.....	15
Shi, B .....	13	Weber, C .....	13
Slowinski, W .....	15	Weng, J.....	10
Smith, L B .....	10, 14, 19	Wermter, S .....	13
Snel, M.....	16	Wersing, H .....	14
Sperati, V.....	11	Whiteson, S.....	16
Spina, G.....	16	Wilkinson, N .....	17
Srivastava, N .....	22	Wrede, B .....	15, 18, 21, 22
Steil, J.....	17	Wu, R .....	20
Stober, J .....	13	Wu, T .....	20
Stulp, F .....	14	Xu, T.....	14
Sun, W .....	13	Yamashita, Y.....	19
Taffoni, F.....	11	Yan, R .....	15
Takanishi, A.....	21	Yoshikawa, Y.....	15, 18, 22
Tani, J.....	16, 19	Yu, C .....	10, 14, 20
ten Bosch, L.....	19	Zeschel, A .....	20
Theodorou, E .....	14	Zhang, H .....	14
Thomaz, A .....	15	Zibner, S.....	15
Tomasello, M.....	9, 19	Ziemke, T .....	13
Toutounji, H .....	17	Zollo, L .....	16

**For your notes**

**For your notes**