

# CURRICULUM VITAE

## January 2012

### Auke Jan Ijspeert

Biorobotics Laboratory  
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#### EDUCATION

- Oct. 1995 – Oct. 1998:*        **PhD in Artificial Intelligence**, University of Edinburgh, UK
- Oct. 1990 - March 1995:*    **Diplôme d'Ingénieur Physicien** (equivalent to BSc, MSc in Physics),  
Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland.

#### PROFESSIONAL EXPERIENCE

- Oct. 2009 - now:*            **Associate Professor**, School of Engineering, EPFL, Switzerland.
- Nov. 2002 – Sept. 2009:*    **Swiss National Science Foundation Assistant Professor**, School of  
Computer and Communication Sciences, EPFL, Switzerland.
- Nov. 2002 - now:*            **Adjunct faculty**, Department of Computer Science, University of  
Southern California, USA.
- Jan. 2001 - now:*            **External collaborator**, Department of Humanoid Robotics and  
Computational Neuroscience, ATR (Advanced Telecommunications  
Research institute), Kyoto, Japan.
- Jan. 2001 – Oct. 2002:*      **Research Assistant Professor** Department of Computer Science,  
University of Southern California, USA.
- June 1999 – Dec. 2000:*    **Postdoctoral researcher** with Prof. M.Arbib and Prof. S.Schaal.  
University of Southern California, USA.
- Oct. 1998 - March 1999:*    **Postdoctoral researcher** with Prof. J.Nicoud and Dr. L.Gambardella.  
EPFL and IDSIA, Switzerland.

#### PRIZES AND ACADEMIC HONORS

1. Best paper award at the IEEE-RAS International conference on Humanoid Robots (Humanoids 2007), Pittsburgh, December 2007.
2. The *Industrial Robot* Highly Commended Award for a paper presented at the 8th International Conference on Climbing and Walking Robots (CLAWAR 2005), London, September 2005.
3. Overall Best Paper Award (out of 1,172 submitted, 689 accepted papers) at the IEEE International Conference on Robotics and Automation (ICRA 2002), Washington D.C., May 2002.
4. Young Professorship award from the Swiss National Science Foundation (2002-2006).
5. Young Researcher scholarship from the Swiss National Science Foundation (1999-2000).

6. Marie Curie Scholarship from the European Commission (1997-1998).
7. Young Researcher scholarship from the Swiss National Science Foundation (1995-1996).

## **AWARDS OBTAINED BY MEMBERS AND STUDENTS OF MY GROUP**

1. Ludovic Righetti (PhD student) received the European Georges Giralt PhD Award 2010 for his PhD thesis.
2. Jonas Buchli (PhD student) was selected as one of the eight finalists for the EPFL best PhD thesis award for the academic year 2007-2008.
3. Alessandro Crespi (PhD Student) received the Best Poster Award for the I&C doctoral program at the EPFL 2006 Research Day.
4. Ludovic Righetti (PhD student) was selected as a finalist (out of three) for the Best Student Paper Award at the International Conference on Robotics and Automation (ICRA06) out of 1756 submitted, 680 accepted articles.
5. Fritz Menzer (Master student) received the EPFL's 2005 Anaheim prize which rewards the best master project connecting biology and computer science.
6. Olivier Michel (postdoc) received the Second prize of the First EURON (the European Robotics Research Network)- Technology Transfer Award in the framework of a CTI funded project with A. J. Ijspeert as Principal Investigator (see Section 7 below), March 2004.
7. Biljana Petreska (Master student) received the EPFL's 2004 Anaheim prize which rewards the best master project connecting biology and computer science.
8. Ludovic Righetti (Master student) received the EPFL's 2004 Landry prize which rewards an outstanding scientific work with original personal research.

## **INVITED LECTURES AT INTERNATIONAL CONFERENCES**

### **KEYNOTE PRESENTATIONS AT INTERNATIONAL CONFERENCES**

1. *Control of Locomotion and Movements Using Pattern Generators: From Biology to Robotics*, 11th IEEE-RAS International Conference on Humanoid Robots, Bled, Slovenia, October 26th - 28th, 2011, **plenary speaker**.
2. *Control of locomotion: from biology to robotics*, EUSFLAT2011 7th conference of the European Society for Fuzzy Logic and Technology (EUSFLAT-2011), Aix Les Bains, July 20, 2011, **plenary speaker**.
3. *Salamander-like amphibious robots capable of swimming and walking*, 4th International Symposium on Aero-Aqua Bio-Mechanisms (ISABMEC2009), Shanghai, Aug29-Sept2 2009, **keynote speaker**.
4. *Decoding the mechanisms of gait generation and gait transition in salamander using mathematical models and robots*, Society for Experimental Biology's Meeting, session 'Integration of Active and Passive Control Mechanisms in Locomotion', Glasgow, UK June 28-July 1, 2009, **keynote speaker**.
5. *Control of locomotion in articulated robots: taking inspiration from vertebrates' spinal cord circuits*, RoboCup International Symposium 2009, TU Graz, Austria, June 30, 2009, **keynote speaker**.
6. *Robots as tools for research in neuroscience and animal motor control*, Journées Nationales de la Recherche en Robotique 2007, Obernai, France, October 9-12, 2007, **plenary speaker**.

7. *Adaptive locomotion in animals and robots*, Twelfth Portuguese Conference on Artificial Intelligence, Covilha, Portugal, December 5-8 2005, **keynote speaker**.
8. *Pattern generators in the central nervous system: numerical models and applications to robotics*, The 3rd International Symposium on Adaptive Motion in Animals and Machines (AMAM2005), Technical University of Ilmenau, Germany, September 25-30 2005, **keynote speaker**.
9. *Evolutionary approaches to articulated robot locomotion using neural oscillators*, International Conference on Evolvable Systems (ICES2005), Barcelona, Spain, September 12 2005, **keynote speaker**.
10. *Pattern generators: from biological observations to implementations in salamander-like and humanoid robots*, 49th Internationales Wissenschaftliches Kolloquium (IWK49), Technical University of Ilmenau, Germany, 27 September 2004, **plenary speaker**.
11. *Computational models of movement control in lampreys, salamanders, and humanoid robots*, Symposium on Evolvability & Interaction, Queen Mary University of London, UK, 8-10 October 2003, **keynote speaker**.
12. *Imitation of human-demonstrated movements with nonlinear dynamical systems in humanoid robot*, Human Centered Robotic Systems Symposium (HCRS 2002), Karlsruhe, Germany, Dec. 2002, **plenary speaker**.

## INVITED PRESENTATIONS AT INTERNATIONAL SUMMER SCHOOLS

1. *Control of locomotion using central pattern generators: from biology to robotics*, Barcelona Cognition, Brain and Technology summer school, Barcelona, Spain, Sept 5-16, 2011, **invited faculty**.
2. *Investigating the locomotor circuits in the spinal cord of lower vertebrates using mathematical models and robots*. Dynamic Walking and Running with Robots summer school, ETHZ, July 11-15, 2011, **invited faculty**.
3. *Central pattern generators: a route to embodied intelligence?* Embodied Intelligence Summer School, Livorno, September 21, 2010, **invited faculty**.
4. *Biologically Inspired robotics: locomotion, central pattern generators, and motor primitives*, Interdisciplinary College 2009, Lake Möhne, Germany, March 6 - 13, 2009, **invited faculty**.
5. *Online learning for locomotion control*, Player Summer School on Cognitive Robotics, Munich, Germany, August 13-20 2007, **invited faculty**.
6. *Control of locomotion: from biology to robotics and back*, 5th European Neuro-IT and Neuroengineering Summer School, Delmenhorst, Germany, July 15-21 2007, **invited faculty**.
7. *Central pattern generators for locomotion control: Mathematical models and experiments with lamprey and salamander robots*, Workshop on neuromorphic engineering, Telluride, USA, July 1-21 2007, **invited faculty**.
8. *Central pattern generators for locomotion: biological concepts, neuromechanical simulations, and applications to robotics*, 3rd European Neuro-IT and Neuroengineering Summer School, Venice, Italy, June 18-25 2005, **invited faculty**.
9. *Contrôle de la locomotion chez la salamandre: expériences neurophysiologiques, modélisation, et implémentation robotique*, Summer School on Integrative Neuroscience, Concarneau, France (A. Berthoz, organizer), August 2004, **invited faculty**.

## INVITED PRESENTATIONS AT INTERNATIONAL CONFERENCES OR WORKSHOPS

1. *Investigating the locomotor circuits in the spinal cord of lower vertebrates using mathematical models and robots*. Central Pattern Generator workshop, CNS2011- Computational Neuroscience Symposium, July 27, Stockholm, 2011.

2. *Decoding the mechanisms of gait generation and gait transition in salamander using mathematical models and robots*, Bio-ICT Convergence on Rhythmicity and Motor Control workshop, June 30th- July 2nd 2009, Sheffield, UK.
3. *Decoding the mechanisms of gait generation and gait transition in salamander using mathematical models and robots*, Progress in Motor Control VII 2009, July 23-25 2009, Marseille, France, invited talk.
4. *Control of visually-guided crawling in the humanoid infant robot iCub, a dynamical systems approach*, Workshop on Approaches to Sensorimotor Learning on Humanoid Robots, at ICRA 2009, May 17, 2009, Kobe, Japan, invited talk.
5. *Using robots and mathematical models to explore gait generation and gait transition in salamander*, Workshop on Future Trends of Mobiligence, at ICRA 2009, May 13, 2009, Kobe, Japan, invited talk.
6. *Stochasticity in locomotion control: a dynamical systems approach*, Workshop on Stochasticity in Robotics and Biological Systems, at ICRA 2009, May 12, 2009, Kobe, Japan, invited talk.
7. *Sensorimotor coordination abilities of animals as inspiration for the control of robots' locomotion*, Third International Conference on Smart Materials, Structures, and Systems, June 8-13 2008, Acireale, Sicily, Italy, invited talk.
8. *Towards a new generation of amphibious robots* Fourth International Symposium of Adaptive Motion of Animals and Machines (AMAM 2008), June 1-6, 2008, Case Western Reserve University, Cleveland, Ohio, USA, Invited seminar talk.
9. *Using dynamical systems as motor primitives for rich motor skills in robots* Research symposium on "Cognitive Interaction: Perspectives of Cognition and Technology", official inauguration of the newly founded Excellence Cluster "Cognitive Interaction Technology" (CITEC), May 27-28, Bielefeld University, Germany, invited research talk.
10. *What can robots tell us about motor control?* 18th Annual Meeting of Neural Control of Movement April 29 - May 4, 2008, Naples, Florida, USA, invited talk.
11. *Using mathematical models and robots to study animal locomotion control* workshop on the Neuromechanics of Locomotion organized by Philip Holmes, Robert Full, and Ansgar Bueschges, March 31 April 4, 2008, Mathematical Biosciences Institute (MBI), Ohio State University, USA, invited talk.
12. *Study of Animal Locomotion Control using Systems of Coupled Oscillators*, ZIF Workshop on the Evolution and Structure of Complex Systems and Networks, Bielefeld, Germany. February 26 2008, invited talk.
13. *From swimming to walking: using robots and numerical models to get insights into the modifications of locomotor circuits during vertebrate evolution*, Workshop on Biomimetic Robotics, ICRA'07 2007 IEEE International Conference on Robotics and Automation, 10-14 April 2007, Roma, Italy, invited talk.
14. *Learning to move with modular robots using central pattern generators and online optimization*, Workshop on Collective Behaviors inspired by Biological and Biochemical Systems, ICRA'07 2007 IEEE International Conference on Robotics and Automation, 10-14 April 2007, Roma, Italy, invited talk.
15. *Systems of coupled nonlinear oscillators for online locomotion control in robots*, Conference on Mathematical Stability Analysis in Biomechanics and Robotics, Center of Interdisciplinary Research (ZiF), Bielefeld University, Germany, February 15-17 2007, invited talk.
16. *Anguilliform swimming with a snake-like robot*, ECCOMAS Conference on Computational Fluid Dynamics, Biomimetics and Fluid Mechanics mini-symposium, Egmond aan Zee, The Netherlands, September 5 - 8, 2006, invited talk.
17. *Nonlinear dynamical systems for the modular control of locomotion and movement: experiments with pattern generators*. Workshop on Modular Foundations for Control and Perception, Robotics:

Science and Systems Conference 2005, Massachusetts Institute of Technology, USA, June 8-11 2005, invited talk.

18. *Learning to locomote with modular robots*, Workshop on Learning for Locomotion, Robotics: Science and Systems Conference 2005, Massachusetts Institute of Technology, USA, June 8-11 2005, invited talk.
19. *From lampreys to salamanders: neuromechanical simulations of gait transitions between swimming and walking in the salamander*, 7th International Congress of Vertebrate Morphology, 27 July 2004 -01 August 2004, Boca Raton, USA, invited talk.
20. *Lower vertebrate locomotion control: neuronal and robotic models*, LEURRE Project Workshop, From solitary animals to social robots. 11 March 2004, Amsterdam, The Netherlands, invited talk.
21. *Computational modeling of lower vertebrate locomotion: control of swimming and walking in the salamander*, European Workshop on Movement Sciences (EWOMS 2003), Muenster, Germany, May 2003, invited talk.
22. *Imitation of human-demonstrated movements with nonlinear dynamical systems in humanoid robots*, Sensory-Motor Coordination in Human-Robot Interaction Workshop at IROS 2002, Lausanne, Switzerland, Oct. 2002, invited talk.
23. *Locomotion and visually-guided behavior in salamander: a neuromechanical study*, Sensor Fusion and Decentralized Control in Robotic Systems III, Boston, USA, Nov. 2000, invited paper.
24. *A neuromechanical investigation of salamander locomotion*, International Symposium on Adaptive Motion of Animals and Machines, Montreal, Canada, Aug. 2000, invited paper.
25. *A 3-D biomechanical model of the salamander*, Second International Conference on Virtual Worlds, Paris, France, July 2000, invited paper.
26. *Evolution of neural controllers for salamander-like locomotion*, Sensor Fusion and Decentralized Control in Robotic Systems II, Boston, USA, Sept. 1999, invited paper.

## **REGULAR PRESENTATIONS AT INTERNATIONAL CONFERENCES**

See the first-authored conference articles in the publication list.

## **SELECTED PRESENTATIONS AT UNIVERSITIES AND RESEARCH INSTITUTES**

1. *Control of locomotion using central pattern generators: modeling of lower vertebrates and applications to robotics*. KTH, Stockholm, Sweden, Feb 11 2011.
2. *Control of locomotion using central pattern generators: modeling of lower vertebrates and applications to robotics*, Max Planck Institute for Biological Cybernetics, Tuebingen, Germany, June 14, 2010
3. *Control of locomotion using central pattern generators: modeling of lower vertebrates and applications to robotics*, Sant'Anna School of Advanced Studies, Italy, March 15, 2010
4. *Decoding the mechanisms of gait transition from swimming to walking in salamander*, University of Koeln, Germany, November 10, 2008
5. *Central pattern generators for locomotion control in animals and robots*, Université de la Méditerranée, Marseille, France, July 10 2008
6. *Central pattern generators for locomotion control in animals and robots*, ETHZ, Switzerland, March 6, 2008
7. *Central pattern generators for locomotion control in animals and robots*, Caltech, USA, September 12, 2007

8. *Central pattern generators for locomotion control in animals and robots*, University of Southern California, USA, September 11, 2007
9. *Central pattern generators for locomotion control in animals and robots*, Stanford University, USA, September 6, 2007
10. *Central pattern generators for locomotion control in animals and robots*, Institute of Robotics, Carnegie Mellon University, USA, June 14, 2007
11. *Central pattern generators for locomotion control in animals and robots*, Robotics Center, Massachusetts Institute of Technology, USA, June 12, 2007
12. *Central pattern generators for locomotion control in animals and robots*, Department of Engineering, University of Cambridge, UK, May 25, 2007
13. *Roombots: Modular robotics for adaptive and self-organizing furniture*, Microsoft Research Laboratory, Cambridge, UK, May 24, 2007
14. *Control of locomotion based on central pattern generators: from neurobiology to robotics*, Institut de Recherche en Communications et en Cybernétique, Ecole des Mines, Nantes, France, May 3, 2007
15. *Balance between Adaptability and Stability*, European Space Agency, Noordwijk, The Netherlands, November 5 2004
16. *Pattern generators: from biological observations to implementations in salamander-like and humanoid robots*, Swiss Federal Institute of Technology Zurich, Neuroinformatics Institute, Switzerland, October 22 2004
17. *Learning, replaying, and modulating movements in humanoid robots using pattern generators*, Technical University of Graz, Computer Science Department, Austria, June 16 2004
18. *Robotique biologiquement inspirée: Construction d'un robot salamandre capable de nager et de marcher*, University of Bordeaux, France, May 17 2004,
19. *Movement and locomotion control using pattern generators in animal and robots*, ATR, Kyoto, Japan, September 2003,
20. *NeuroRobotics: Computational models of movement control in animals and robots*, EPFL, Brain and Mind Institute, Switzerland, June 2003,
21. *Computational models of movement control in lampreys, salamanders, and humanoid robots*, Technical University of Ilmenau, Mechanical Engineering Department, Germany, May 2003,
22. *Computational models of movement control in lampreys, salamanders, and humanoid robots*, EPFL, Brain and Mind Institute, Switzerland, February 2003,
23. *Modeling the transition from swimming to walking in salamander locomotion using nonlinear oscillators*, University of Bordeaux, France, January 2003,
24. *Learning movements by demonstration in a humanoid robot using nonlinear dynamical systems*, University of Zurich, Artificial Intelligence Laboratory, Switzerland, November 26 2002,
25. *Learning discrete and rhythmic movements in a humanoid robot using nonlinear dynamical systems*, USC, Department of Kinesiology, USA, September 2002
26. *Rhythmic pattern generation: from lamprey to salamander, and to ... a humanoid robot*, ATR, Kyoto, Japan, August 2002

## DIPLOMA AND DOCTORAL STUDENTS

### CURRENT POSTDOC/PHD STUDENT SUPERVISION

1. Dr Alessandro Crespi (Postdoc, EPFL, July 2007 - now) Construction and control of amphibious robots.
2. (soon to be Dr) Rico Moeckel (Postdoc, EPFL, April 2009 – now). Modular robotics
3. Dr. Yannick Morel (Postdoc, EPFL, October 2010 – now). Locomotion control of an electric fish robot
4. Dr Alexander Sproewitz (Postdoc, EPFL, June 2010 - now). Quadruped robotics
5. Dr Luc Guyot (Postdoc EPFL, Jan 2012 – now) Robot simulation (with Cyberbotics)
6. Mostafa Ajallooeian (PhD student, EPFL, July 2010 - now) Motor primitives for robot locomotion
7. Andrej Bicansky (PhD student, EPFL, April 2009 - now) Neural network models of the salamander spinal cord circuit
8. Stephane Bonardi (PhD student, EPFL, February 2010 - now) Self-reconfiguration in modular robots
9. Sebastien Gay (PhD student, EPFL, April 2009 - now) Sensory motor coordination in a humanoid robot
10. Jeremie Knuesel (PhD student, EPFL, March 2008 – now) Mathematical models of lamprey and salamander central pattern generators
11. Kostas Karakasiliotis (PhD student, EPFL, April 2008 – now) Design and construction of novel lamprey and salamander robots
12. Soha Pouya (PhD student, EPFL, April 2009 - now) Online optimization of locomotion control for modular robots
13. Alexander Sproewitz (PhD student, EPFL, June 2006 - now) Modular robotics
14. Jesse van den Kieboom (PhD student, EPFL, April 2009 - now) Control and optimization of a lowerlimb exoskeleton
15. Massimo Vespignani (PhD student, EPFL, Jan 2011 – now) Roombots project
16. Alexandre Tuleu (PhD student, EPFL, Aug 2011 – now) AMARSI project

### PAST POSTDOC/PHD STUDENT SUPERVISION

1. Dr Renaud Ronsse (Postdoc, EPFL, August 2009 – Sept 2010). Now an assistant professor at Université catholique de Louvain, Belgium
2. Dr. Mathieu Porez (Postdoc, EPFL, April 2009 – September 2010). Locomotion control of an electric fish robot. Now a lecturer at the Ecole des Mines de Nantes, France.
3. Dr Masoud Asadpour (Postdoc, EPFL, September 2006 - September 2007), Self-reconfiguration in modular robotics. Now an assistant professor at the University of Teheran, Iran.
4. Dr Olivier Michel (Postdoc, EPFL, April 2003 - March 2004), Development of dynamic simulations of robots with multiple degrees of freedom. Now CEO of Cyberbotics, PSE, Ecublens, Switzerland.
5. Sarah Dégallier (PhD student, EPFL, April 2006 – March 2010) now a Postdoc with Jose Millan, EPFL.

6. Jonas Buchli (PhD student, EPFL, May 2003 - June 2007) Design of adaptive multi-scale dynamical systems for control. Now a group leader at the Italian Institute of Technology. *Buchli's thesis has been selected as one of the 8 finalists for the EPFL's 2008 best PhD Thesis Award.*
7. Ludovic Righetti (PhD student, EPFL, September 2004 – October 2008) Systems of coupled oscillators, numerical modeling of motor learning in infants, humanoid robotics. Now a postdoc at the University of Southern California with Stefan Schaal.
8. Alessandro Crespi (PhD student, EPFL, April 2003 - June 2007) Design, construction and control of a salamander-like robot. Now a postdoc in my group.

## PHD STUDENT CO-SUPERVISION

1. Julio Rodriguez (PhD student, EPFL, with Max-Olivier Hongler as primary supervisor, July 2007 - now). Structural Stability of Noisy Oscillators Implemented in Bio-Inspired Robots.
2. Pierre-André Mudry (PhD student, EPFL, with Gianluca Tempesti as primary supervisor, 2004-2009). A Hardware/Software Codesign Framework for Cellular Computing.
3. Jeffrey Begley (PhD student, USC, fourth year, with Michael Arbib as primary supervisor, Auke Ijspeert as co-supervisor, 2002 - 2009) Numerical simulations of controllers for visuomotor coordination.

## VISITING POSTDOC/PHD STUDENT SUPERVISION

1. Christophe Chariot PhD student, University of Mons, Belgium, March 2010 – June 2010
2. Andrej Gams, Ph.D. student, University of Lubjana, November 2007 - May 2008.
3. Dr. Monica Daley, Postdoctoral fellow, University of Michigan Ann Arbor, October 2006.
4. Aleksandar Lazinica, Ph.D. student, Vienna University of Technology, February - May 2005.
5. Ricardo A. Tellez, Ph.D. Student, Technical University of Catalonia, September 2005 – November 2005.
6. Adel Akbary, PhD student, University of Tehran, Iran, July 2007- December 2007.
7. Mehran Andani, PhD student, University of Tehran, Iran, July 2007- December 2007.

## EPFL MASTER THESIS SUPERVISION (This list does not include semester projects)

### Academic year 2009-2010:

1. Ebru Aydin Co-evolution for Roombots
2. Philippe Laprade Distributed Roombot Locomotion and Self-Reconfiguration
3. Marc Louis CPG-Based Prosthetics Control
4. Alexandre Tuleu Improvement of the Cheetah Locomotion Control
5. Lorenz Küchler Segmented Leg Design in Robotics

### **Academic year 2008-2009:**

- 6. Nicolas Delieutraz Adding an electric sense to a snake-like underwater robot
- 7. Jocelyne Lotfi Self-reconfiguration for Adaptive Furniture

### **Academic year 2007-2008:**

- 8. Michel Ganguin A GCC backend for Move processors
- 9. Aïsha Hitz Synchronization of movements of a real humanoid robot with music
- 10. Christophe Richon Analysis of Bluetooth game controllers
- 11. Simon Ruffieux (at Simon Fraser University, Canada), Modelling and simulation of climbing robots
- 12. Julien Ruffin Self-organized parallel computation

### **Academic year 2006-2007:**

- 13. Matteo T. de Giacomo Visuomotor coordination for the salamander robot
- 14. Sébastien Gay (Exchange student from the National Institute of Applied Sciences in Lyon, France), Planning reconfiguration in self-reconfigurable robotics
- 15. Julien Hamilton (at NASA Ames), Navigation system improvement for planetary rovers.
- 16. Brian Jimenez Centipede Robot Locomotion.
- 17. Elia Palme (Exchange student from University of Fribourg, co-supervised with the CVlab), Stereo vision for the salamander robot
- 18. Michel Yerly (Exchange student from University of Fribourg), Online optimization of locomotion control in modular robots
- 19. Christian Lathion Biped locomotion on the Hoap2 robot
- 20. Jérôme Maye Control of Locomotion in Modular Robotics

### **Academic year 2005-2006:**

- 21. Rafael Arredondo (Exchange student from University of Granada, Spain), Design and simulation of locomotion of self-organizing modular robots for adaptive furniture
- 22. Adamo Maddalena Modular robotics
- 23. Julien Nicolas Evolution of locomotion controllers for a biped robot
- 24. Fabrizio Patuzzo Biped locomotion control
- 25. Sergei Poskriakov (Exchange student from University of Geneva), Dynamic simulator of humanoid robots
- 26. Michel Speiser (in exchange at Waseda University, Tokyo), Effective optimization of real world problems through an hybrid strategy

### Academic year 2004-2005:

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|---------------------------|---|
| 27. Giorgio Brambilla     | Dynamical systems for controlling quadruped locomotion  |
| 28. Pascal Cominoli       | Development of a physical simulation of a real humanoid robot   |
| 29. Edouard Goupy         | (in exchange at Oxford University), Simulation of flocking behavior   |
| 30. Jérôme Guerra         | Reliable oscillator from unreliable elements  |
| 31. Barthelemy von Haller | Evolving swimming controllers for simulated underwater modular robots   |
| 32. Daniel Marbach        | Bio-inspired locomotion control for modular robots  |
| 33. Fritz Menzer          | (in exchange at York University), Modeling transient behaviour in vocal fold vibration using bifurcating nonlinear ordinary differential equation systems. This project received the EPFL's <b>Anaheim prize</b> which rewards the best master project connecting biology and computer science. |
| 34. Marc-Antoine Nussli   | Traveling wave pattern generator using reaction-diffusion systems   |
| 35. Martin Rumo           | (Exchange student from University Fribourg), Simulation framework using parallel computing for generalized integro-reaction-diffusion systems   |

### Academic year 2003-2004:

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|----------------------|--|
| 36. Jérôme Braure    | Participation to the construction of a salamander robot: Exploration of the morphological configuration and the locomotion controller  |
| 37. Bertrand Mesot   | Self-organization of locomotion in modular robots  |
| 38. Stephane Mojon   | Using nonlinear oscillators to control the locomotion of a simulated biped robot   |
| 39. Biljana Petreska | A neural visuomotor controller for a simulated salamander robot. This project received the EPFL's <b>Anaheim prize</b> which rewards the best master project connecting biology and computer science.                                    |
| 40. Ludovic Righetti | Control and synchronization with nonlinear dynamical systems for an application to humanoid robotics. This project received the EPFL's <b>Landry prize</b> which rewards an outstanding scientific work with original personal research. |

### Academic year 2002-2003:

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|--------------------------|--|
| 41. Sebastien Catherinet | Java applet of the salamander neuromechanical simulation     |
| 42. Younes Majdoline     | Design of locomotion controllers using nonlinear oscillators |

## TEACHING ACTIVITIES

### DOCTORAL COURSES

2009-2010 Doctoral course, “Autonomous robots” (with Aude Billard, Dario Floreano, Alcherio Martinoli), in the doctoral program "Manufacturing systems and robotics", EPFL. Optional course with 9 registered PhD students.

2009-2010 Doctoral course “Robotics seminar series” (with Aude Billard and Dario Floreano) in the doctoral program "Manufacturing systems and robotics", EPFL. Optional course with 15 registered PhD students.

2007-2008 Doctoral course, “Autonomous robots” (with Aude Billard, Dario Floreano, Alcherio Martinoli), in the doctoral program "Manufacturing systems and robotics", EPFL. Optional course with 11 registered PhD students.

2006-2007 Doctoral course, “Autonomous robots” (with Aude Billard, Dario Floreano, Alcherio Martinoli), in the doctoral program "Manufacturing systems and robotics", EPFL. Optional course with 31 registered PhD students.

## **MASTER COURSES**

2010-2011 Master level course, “Models of biological sensory-motor systems”, Computer Science and Communication Science, EPFL. Optional course with 26 registered master students.

2009-2010 Master level course, “Models of biological sensory-motor systems”, Computer Science and Communication Science, EPFL. Optional course with 16 registered master students.

2008-2009 Master level course, “Models of biological sensory-motor systems”, Computer Science and Communication Science, EPFL. Optional course with 23 registered master students.

2007-2008 Master level course, “Models of biological sensory-motor systems”, Computer Science and Communication Science, EPFL. Optional course with 29 registered master students.

2006-2007 Master level course, “Models of biological sensory-motor systems”, Computer Science and Communication Science, EPFL. Optional course with 65 registered master students.

2005-2006 Master level course, “Models of biological sensory-motor systems”, Computer Science and Communication Science, EPFL. Optional course with 48 registered master students.

2005-2006 Master level course, “Genetic and Developmental Computing Architectures” with Gianluca Tempesti, Computer Science and Communication Science, EPFL. Optional course with 61 registered master students.

2001-2002 Advanced Graduate Level Course CS599 “Reinforcement Learning”, with Stefan Schaal and Sethu Vijayakumar, Department of Computer Science, USC. Approximately 20 students.

## **BACHELOR COURSES**

2009-2010 Bachelor level course, “Statique et Dynamique”, Microengineering. Together with Hannes Bleuler. Compulsory course with 170 registered bachelor students.

2003-2004, Undergraduate course WS03 410 (open to third and fourth year students) “Biologically Inspired Artificial Intelligence”, Department of Computer Science, University of Zurich. Approximately 25 students.

## **INNOVATIVE TEACHING SUPPORT**

EPFL Grant for Innovation in Teaching Methods. “Interactive simulations for mobile robots”, **Primary Investigator (PI)**, with Alcherio Martinoli (SWIS-EPFL) and Dario Floreano (LIS-EPFL) as Co-PIs. December 2004 – March 2006. Total: CHF 135'000.- This project has allowed us to transform and add utilities to Webots, a professional robot simulation software, to make it suitable for teaching. In particular, additions were made to make the software usable for lab projects and for demonstrating robotic concepts during lectures.

# FUNDING RECORD

## CURRENT GRANTS

1. European Commission, Integrated Project, ICT FP7, Cognitive Systems. Title: "AMARSI, Adaptive Modular Architecture for Rich Motor Skills", **Co-Principal Investigator (Co-PI)** with 9 other European institutions. EPFL's share: Euros 925'000. March 2010 – February 2014.
2. European Commission, STREP, ICT FP7, FET Embodied Intelligence. Title: "LOCOMORPH, Robust Robotic Locomotion and Movements Through Morphology and Morphosis", **Co-Principal Investigator (Co-PI)** with 4 other European institutions. EPFL's share: Euros 540'000. February 2009 – January 2013.
3. European Commission, STREP, ICT FP7, FET Embodied Intelligence. Title: "ANGELS, ANGuilliform robot with ELeCtric Sense", **Co-PI** with 7 other International institutions. My group's share: Euros 310'000. February 2009 – January 2012.
4. European Commission, STREP, ICT FP7, FET Embodied Intelligence. Title: "EVRYON, Evolving Morphologies for Human-Robot Symbiotic Interaction", **Co-PI** with 4 other European institutions. EPFL's share: Euros 380'000. February 2009 – January 2012.
5. SystemsX, Swiss Initiative for Systems Biology, IPhP grant. Title: "Decoding the mechanisms of gait generation and gait ransition in salamander: a systems biology approach". **Principal Investigator (PI)**. With T. Wannier (U. Fribourg). Total: 171'725 CHF. September 2008 – August 2011.
6. European Commission, STREP, ICT FP7, Bio-ICT convergence. Title: "LAMPETRA, Life-like Artefact for Motor-Postural Experiments and Development of new Control Technologies inspired by Rapid Animal locomotion", **Co-PI** with 4 other European institutions. February 2008 - January 2011. Total: Euros 1'900'000.-. EPFL's share: Euros 370'000.

## PAST GRANTS

7. European Commission, Information Society Technologies, Integrated Project, Title: "Robotic Open-Architecture Technology for Cognition, Understanding and Behaviors", **Co-PI** with 9 other European universities. September 2004 - August 2009, Total: Euros 9'450'000.- (EPFL's share: Euros 700'000, shared with Aude Billard, head of the Learning Algorithms and Systems Laboratory)
8. Swiss National Science Foundation, extension grant for a SNF professorship, Title: "Locomotion control in natural and artificial systems" **PI**. November 2006-October 2008, Total: CHF 629'605.-
9. Swiss National Science Foundation, in the framework of the 2005 Indo-Swiss Joint Research Programme. Title: "Development of Active Prosthetic Limbs for Physically Challenged Persons using Robotics Technology", **PI** in collaboration with Prof G.C. Nandi from IIT Allahabad. December 2005 - November 2008. Total: CHF 27'000.-
10. EPFL Grant for Innovation in Teaching Methods. "Roombots: Modular robotics for adaptive and self-organizing furniture" **PI**, with Aude Billard (ASL3-EPFL) and Pierre Dillenbourg (CRAFT-EPFL) as Co-PIs. October 2005 - September 2008. Total: CHF 202'710.-
11. Collaborative Research Grant from Microsoft Research Cambridge. "Roombots: Modular robotics for adaptive and self-organizing furniture" **PI**. September 2006 - August 2007. Total: Euros 93'000.- (This project was one of the 7 selected out of more than 200 submitted proposals).
12. Award from the Latsis Foundation to organize the Latsis 2006 symposium at EPFL (Main organizer). **PI**. Co-organizers: Martin Hasler (LANOS, EPFL), Wulfram Gerstner (LCN, EPFL), Henry Markram (LNMC, EPFL), Aude Billard (ASL, EPFL), and Dario Floreano (LIS, EPFL). CHF Award: 50'000.- .

13. EPFL Grant for Innovation in Teaching Methods. "Interactive simulations for mobile robots" **PI**, with Alcherio Martinoli (SWIS-EPFL) and Dario Floreano (LIS-EPFL) as Co-PIs. December 2004 - March 2006. Total: CHF 135'000.-
14. Swiss National Science Foundation, grant for a SNF professorship, Title: "Locomotion control in natural and artificial systems" **PI**. November 2002-October 2006, Total: CHF 1'253'444.-
15. French *Ministère de la Recherche et de la Technologie* (program *Neurosciences Intégratives et Computationnelles*), Title: "Locomotion in salamander: neural control, mathematical and neuro-mechanical modeling", **Co-PI** with Jean-Marie Cabelguen (PI) and Alain Oustaloup (Université de Bordeaux). September 2003 - August 2006, Total : Euros 150'000.- (EPFL's share: Euros 10'000.)
16. European Space Agency, Title: "Bionics and Space System Design" **Co-PI** with 10 other European partners. May 2004 - April 2005, Total of the EPFL's share: Euros 9'500.-
17. CTI Technology Transfer grant from the Swiss Commission for Technology and Innovation with Cyberbotics (Ecublens). Title: "Development of a physics-based simulation for mobile robots with multiple degrees of freedom". **PI**. April 2003-March 2005, Total: CHF 259'382.-
18. EPFL equipment grant. Title: "Acquisition of a full size humanoid robot" **Co-PI**, Joint project with Aude Billard (PI, ASL3-EPFL) and Henry Markram (SV-EPFL). January 2004. Total: CHF 100'000.-
19. French *Ministère de la Recherche et de la Technologie* (program *Neurosciences Intégratives et Computationnelles*), Title: "Locomotion in salamander: neural control, mathematical and neuro-mechanical modeling", **Co-PI** with Jean-Marie Cabelguen (PI) and Alain Oustaloup (Université de Bordeaux). September 2002-August 2003, Total : Euros 7'000.- (Seed grant)
20. NSF-ITR grant, Title: "The Virtual Trainer", **Co-PI** with Stefan Schaal (PI) and Carolee Winstein (USC), September 2000-August 2003, Total: US\$ 499'971.-

## EXTERNAL COLLABORATOR ON THE FOLLOWING GRANTS

Austrian Science Fund, Title: "Adaptive Robot Control based on Neural Microcircuits", Wolfgang Maass (PI), Technical University of Graz, external collaborator with Henry Markram, Laboratory of Neural Microcircuits (SV-EPFL). April 2004 - March 2006

EPFL Sport and Rehabilitation Engineering project, Title: "Athletic Video Re-synthesis", Daniel Thalmann (PI), external collaborator with Pascal Fua, Kamiar Aminian, and Aude Billard. 2005-2008.

## OTHER PROFESSIONAL ACTIVITIES

### CONFERENCE ORGANIZATION

1. Executive Program Committee Member, Poster Chairman, and Awards Chairman of BioRob2008, The second IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics, October 19-22, 2008, Scottsdale, Arizona, USA.
2. **General chairman** of the EPFL-Latsis 2006 Symposium, Dynamical principles for neuroscience and intelligent biomimetic devices, March 8-10 2006, EPFL, Switzerland.
3. **Program Committee Chairman** of Bio-ADIT 2006, the Second International Workshop on Biologically Inspired Approaches to Advanced Information Technology, January 26-27, 2006, Osaka, Japan.
4. **Program Committee Chairman** of AMAM2005, the Third International Symposium on Adaptive Motion in Animals and Machines, September 26-30, 2005, Ilmenau, Germany.
5. **Program Committee Chairman** of SAB 2004, the Eighth International Conference on the Simulation of Adaptive Behavior (From Animals to Animats 8), July 13-17 2004, Los Angeles.
6. **Program Committee Chairman** of Bio-ADIT 2004, the First International Workshop on Biologically Inspired Approaches to Advanced Information Technology, January 29-30, 2004, EPFL, Lausanne.

### WORKSHOP AND TUTORIAL ORGANIZATION

1. Main organizer of a workshop entitled "Control of locomotion: from animals to robots" at the Robotics: Science and Systems Conference (RSS 2008), ETH Zurich, Switzerland, June 28, 2008.
2. Co-Organizer of a tutorial entitled "Dynamical systems for biologically-inspired robotic motor control", at the IEEE International Conference on Intelligent Robots (IROS 2003), Las Vegas, October 31 2003.
3. Co-Organizer of a workshop entitled "Neurorobotic Models in Neuroscience and Neuroinformatics", July 17 2004, Los Angeles.
4. Organizer and technical chair of a session on Biologically Inspired Robotics at the SPIE SFDCRSIII conference, November 2000.
5. Co-Organizer of the USC motor- and locomotion control meetings, 1999-2002
6. Co-Organizer of an Interdisciplinary workshop on Robotics, Biology and Psychology, University of Edinburgh, March 1997.

### MEMBER OF PROGRAM COMMITTEE

1. AMAM2011            The Fifth International Symposium on Adaptive Motion in Animals and Machines
2. ICMC2011           2nd International Conference on Morphological Computation
3. ICORR 2011        IEEE 12<sup>th</sup> International Conference on Rehabilitation Robotics
4. DARS2010           10th International Symposium on Distributed Autonomous Robotics System
5. BIOROB2010        [Associate Editor] Third IEEE-RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics
6. SAB2010            From Animals to Animats 11, The Eleventh International Conference on the Simulation of Adaptive Behavior

7. Humanoids2009 IEEE-RAS International Conference on Humanoid Robots
8. IROS2009 [Associate Editor] IEEE International Conference on Intelligent Robots and Systems
9. ICRA2009 [Associate Editor] IEEE International Conference on Robotics and Automation
10. RoBio2008 IEEE International Conference on Robotics and Biomimetics
11. Humanoids2008 IEEE-RAS International Conference on Humanoid Robots
12. DARS2008 9th International Symposium on Distributed Autonomous Robotic Systems
13. IROS2008 [Associate Editor] IEEE International Conference on Intelligent Robots and Systems
14. RSS2008 Robotics: Science and Systems 2008
15. GECCO2008 Genetic and Evolutionary Computation conference
16. BioRob2008 [Associate Editor] Second IEEE-RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics
17. ALife XI The Eleventh International Conference on the Simulation and Synthesis of Living Systems
18. SAB2008 From Animals to Animats 10, The Tenth International Conference on the Simulation of Adaptive Behavior
19. Humanoids2007 IEEE-RAS International Conference on Humanoid Robots
20. ECAL2007 The Ninth European Conference on Artificial Life
21. Humanoids2006 IEEE-RAS International Conference on Humanoid Robots
22. CEC2006 IEEE Congress on Evolutionary Computation
23. SAB2006 From Animals to Animats 9, The Ninth International Conference on the Simulation of Adaptive Behavior
24. IAS-9 The 9th International Conference on Intelligent Autonomous Systems, 2006
25. BioRob2006 First IEEE-RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics
26. Humanoids2005 IEEE-RAS International Conference on Humanoid Robots
27. CEC2005 IEEE Congress on Evolutionary Computation, special sessions on Complex Adaptive Systems and Artificial Life
28. ECAL2005 The Eighth European Conference on Artificial Life
29. ICDL2005 The Fourth International Conference on Development and Learning
30. ICRA2005 IEEE International Conference on Robotics and Automation
31. Imitation2005 The Third International Symposium on Imitation in Animals and Artifacts
32. AMAM2005 The Third International Symposium on Adaptive Motion in Animals and Machines
33. Humanoids2004 Fourth IEEE International Conference on Humanoid Robots
34. GECCO2004 Genetic and Evolutionary Computation conference
35. SAB2004 From Animals to Animats 8, The Eighth International Conference on the Simulation of Adaptive Behavior
36. Bio-ADIT2004 The First International Workshop on Biologically-Inspired Approaches to Advanced Information Technology
37. Humanoids2003 Third IEEE International Conference on Humanoid Robots

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|----------------|--|
| 38. IPCAT2003  | The 5th International Workshop on Information Processing in Cells and Tissues                          |
| 39. CIIC2003   | International Congress on Computational Intelligence   |
| 40. AMAM2003   | Second International Symposium on Adaptive Motion of Animals and Machines                              |
| 41. EvoRob2003 | Second European Workshop on Evolutionary Robotics  |
| 42. SAB2002    | From Animals to Animats 7, The Seventh International Conference on the Simulation of Adaptive Behavior |
| 43. SAB2000    | From Animals to Animats 6, The Sixth International Conference on the Simulation of Adaptive Behavior   |
| 44. AMAM2000   | First International Symposium on Adaptive Motion of Animals and Machines                               |
| 45. VW2000     | Second international conference on Virtual Worlds  |
| 46. IJCNN2000  | International Joint Conference on Neural Networks  |
| 47. ECAL1999   | Fifth European Conference on Artificial Life   |

## **EDITORSHIP**

Associate editor for the IEEE Transactions on Robotics

Guest editor for the journal Biological Cybernetics on a special issue on the use of robots as tools in neuroscience. To appear in 2012

Guest editor for the IEEE Transactions on Mechatronics on a special issue on biomimetic design. To appear in 2012

Guest editor for the journal of Autonomous Robots on a special issue on locomotion control. 2010.

Guest editor for the IEEE Transactions on Biomedical Engineering on a special issue on Rehabilitation Robotics. Volume 56, Issue 9, September 2009.

Guest editor for the journal Biological Cybernetics on a special issue on Dynamical Principles in Neural Systems and Robotics, Volume 95, Number 6 / December, 2006.

## **REVIEWER**

### **Journals:**

1. ACM Transactions on Adaptive and Autonomous Systems,
2. Adaptive Behavior,
3. Artificial Life,
4. Autonomous Robots,
5. Biological Cybernetics,
6. Cognitive Systems Research,
7. European Journal of Neuroscience,
8. IEEE Transactions on Circuits and Systems,
9. IEEE Transactions on Evolutionary Computation,
10. IEEE Transactions on Robotics,
11. IEEE Transactions on Systems Man and Cybernetics,
12. International Journal of Humanoid Robotics,
13. Journal of Theoretical Biology,

14. Nature Physics,
15. Neural Networks,
16. Robotics and Autonomous Systems,
17. Science,
18. SIAM Journal on Applied Dynamical Systems.

### **Edited books:**

The Handbook of Brain Theory and Neural Network (M.Arbib Ed.) MIT Press.

### **Funding agencies:**

1. US National Science Foundation (NSF),
2. US National Institutes of Health (NIH),
3. EU Framework Programme for Research and Technology Development (FP6),
4. Swiss National Science Foundation,
5. UK's Engineering and Physical Sciences Research Council (EPSRC),
6. Agence Nationale de la Recherche (ANR, France),
7. the Nutfield Foundation (UK).

### **FUNDING REVIEW PANELS AND CONSULTING**

1. Member of the Evaluation Committee for the program "Interactive and robotic systems", Agence Nationale de la Recherche (ANR, France), April-June 2007.
2. Member of the Evaluation Committee for the program "Interactive and robotic systems", Agence Nationale de la Recherche (ANR, France), June-September 2006.
3. Invited presenter and participant at the workshop "Cognitive Robotics" to define the Cognitive Systems research agenda in the European Commissions 7th Framework Programme (2007-2011), Luxembourg, December 2005.
4. Member of the review panel for 6th EU Framework Programme for Research and Technology Development (FP6) Information Society Technologies (IST-2.4.8. Cognitive Systems), Brussels, April 2005.
5. Member of the review panel for the Joint NSF/NIH Initiative to Support Collaborative Research in Computational Neuroscience, Washington DC, May 2002.

### **ADVISORY BOARDS/STEERING COMMITTEES**

1. Member of the Virtual Faculty for the Center of Excellence in Cognitive Interaction Technology (CITEC funded by the German Excellence Initiative), Bielefeld University, Germany, November 2007–now.
2. Member of the Advisory Board for JRL-France (the Joint Japanese-French Robotics Laboratory at Toulouse, CNRS-AIST), October 2005-now.
3. Member of the Evaluation Committee for the creation of the ISIR, "Institut Systemes Intelligents et Robotique" (a new institute under the joint affiliation of the CNRS, University of Paris VI, and CEA) in Paris (France), February 2006.
4. Member of the Steering Committee for the Bio-ADIT conferences, May 2005-now.

5. Member of the International Organizing Committee for the AMAM conferences, September 2004-now.

## THESIS COMMITTEES

1. Internal expert for Peter Duerr, Laboratory of Intelligent Systems (Prof. D. Floreano), EPFL, December 17, 2010.
2. Internal expert for Sabine Hauert, Laboratory of Intelligent Systems (Prof. D. Floreano), EPFL, November 5, 2010.
3. **External expert** for Mirko Bordignon, University of Southern Denmark, Denmark (Prof. U. P. Schultz), October 26, 2010.
4. Internal expert for Hossein Rouhani, Laboratory of Movement Analysis and Measurement (Prof. K. Aminian), EPFL, October 22, 2010.
5. Internal expert for Xavier Righetti, Virtual Reality Laboratory (Prof. D. Thalmann), EPFL, October 12, 2010.
6. **External expert** for Helmut Hauser, Technical University of Graz (Prof. W. Maass), September 7, 2010.
7. Internal expert for Gorka Galdos, Automatic Control Laboratory (Prof. R. Longchamp), EPFL, May 31, 2010.
8. Internal expert for Mirko Kovac, Laboratory of Intelligent Systems (Prof. D. Floreano), EPFL, May 31, 2010.
9. Internal expert for Sylvain Cardin, Virtual Reality Laboratory (Prof. D. Thalmann), EPFL, April 12, 2010.
10. **External expert** for Matthew Howard, University of Edinburgh (Dr. Sethu Vijayakumar), July 2, 2009.
11. **External expert** for Milanka Ringwald, ETHZ, Switzerland (Prof. R. Douglas and Prof. P. Verschure), February 24, 2009.
12. **External expert** for David Christensen, University of Southern Denmark, Denmark (Prof. H.H. Lund), November 5, 2008.
13. Internal expert for Gediminas Luksys, Behavioral Genetics Laboratory and Computational Neuroscience Laboratory (Prof. C. Sandi and Prof. W. Gerstner), EPFL, December 5, 2008.
14. Internal expert for Kumiko Oshima, Laboratory of Nonlinear Systems (Prof. M. Hasler), EPFL, September 12, 2008.
15. **External expert** for Julien Serres, Université de Montpellier II, France (Prof. Nicolas Franceschini), July 11, 2008.
16. Internal expert for Slavisa Sarafijanovic, Laboratory for computer Communications and Applications (Prof. J.-Y Le Boudec), EPFL, April 28, 2008.
17. President of the thesis committee for Bertand Mesot, IDIAP (Prof. H. Bourlard), EPFL, March 18, 2008.
18. Internal expert for Julien Favre, Laboratory of Movement Analysis and Measurement (Prof. K. Aminian), EPFL, March 3, 2008.
19. **External expert** for Rodolphe Héliot, INRIA Grenoble, France (Prof. Bernard Espiau), October 26, 2007.
20. Internal expert for Denis Sheynikhovich, Laboratory of Computational Neuroscience (Prof. W. Gerstner), EPFL, September 21, 2007.

21. **External expert** for Mathieu Porez, IRCyNN, Ecole des Mines de Nantes, France (Prof. Frédéric Boyer), September 19, 2007.
22. President of the thesis committee for M. Ruohua Zhou, Signal Processing Laboratory (LTS3 Dr. Marco Mattavelli), EPFL, September 13, 2006.
23. Internal expert for Rajesh Langoju, Applied Computing and Mechanics Laboratory (Prof. P. Rastogi), EPFL, August 21, 2006.
24. Internal expert for Abhijit Patil, Applied Computing and Mechanics Laboratory (Prof. P. Rastogi), EPFL, July 4, 2006.
25. Internal expert for Etienne De Sevin, Virtual Reality Laboratory (Prof. D. Thalmann), EPFL, February 2, 2006.
26. Internal expert for Julien Mayor, Laboratory of Computational Neuroscience (Prof. W. Gerstner), EPFL, June 14, 2005.
27. Internal expert for Peter Miko, Laboratory for Computer-Aided Design and Production (Prof. P. Xirouchakis), EPFL, April 18, 2005.
28. Internal expert for Claudio Mattiussi, Laboratory of Autonomous Systems (Prof. D. Floreano), EPFL, February 2, 2005.
29. Internal expert for Branislav Ulicny, Virtual Reality Laboratory, EPFL (Prof. D. Thalmann), January 27, 2005.
30. Internal expert for Norman Baier, Laboratory of Nonlinear Dynamical systems (Prof. M. Hasler), EPFL, October 15, 2004.
31. **External expert** for Lukas Lichtensteiger, Artificial Intelligence Laboratory (Prof. R. Pfeifer), University of Zurich, June 9, 2004.
32. Internal expert for Thomas Stroesslin, Laboratory of Computational Neuroscience (Prof. W. Gerstner), EPFL, February 27, 2004.
33. **External expert** for Stéphane Doncieux, AnimatLab (Prof. J.A. Meyer), University of Paris 6, June 23, 2003.

## **ADMINISTRATIVE ACTIVITIES**

### **COMMITTEES**

1. Coordinator for the Master in Bioengineering. September 2010 – now.
2. Coordinator for the interdisciplinary robot competition of the School of Engineering. January 2011 – now.
3. Chair of the jury committee for the ABB award at EPFL. March 2008 - now.
4. Chair of the jury committee for the Anaheim-Matille award at EPFL. April 2010 - now.
5. Member of the Robert Gnehm Fonds (ETH foundation for the support of children daycare). October 2010 – now.
6. Coordinator for Distributed and Cognitive Robotics for the IST-EPFL joint doctoral program. August 2008 – now.
7. Member of the steering committee of the NCCR in robotics. December 2011 - now
8. Head of the Education and Society committee of the NCCR in robotics. September 2010 – now.
9. Chair of the faculty search committee for Autonomous Robotics. September 2010 – December 2011.
10. Member of the faculty search committee for Neuroprosthetics. April 2009 – December 2011.
11. Member of the Faculty Council of the EPFL's School of Computer and Communications Sciences. April 2006 – June 2008.
12. Member of the EPFL's School of Computer and Communications Sciences committee for the organization and the allocation of space in the School's new building. June 2003-March 2005.
13. Member of the EPFL's school of Computer and Communications Sciences committee for the design of the new advertisement brochure for prospective students for computer science studies. June 2003 - March 2004.
14. Member of the Integrated Systems Center (EPFL).
15. Member of an EPFL delegation to IST (Instituto Superior Tecnico, Lisbon, Portugal) for preparing a formal collaboration between IST and EPFL. May 14-15 2007

### **SERVICE AND OUTREACH**

1. Program advisor for master students and pre-doctoral students, School of Computer and Communication Science, EPFL, 2004-2005.
2. Presentation to high-school teachers about the requirements in mathematics and physics for doing research in computer science, February 2006, February 2007.
3. Design of a live and interactive demonstration for the general public of a fish robot displayed in the new Communication Science building, February 2006 - Jan 2008.
4. Regular presentations and demonstrations to visitors, in particular prospective students, about the use of computer science tools for robotics and biological modeling. In average 15-20 demos per year by my students or me.
5. Presentation of the salamander robot at the Wired Nextfest exhibition (on invitation. 50'000 visitors), Los Angeles Convention Center, USA, September 13-16, 2007.
6. Regular appearance in the local and international media: Discovery Channel, Swiss National TV, German National TV, National Public Radio (USA), Swiss National Radio, France Inter (France), German National radio, CNN (web), BBC (web), Fox news (web), New Scientist, New York Times

(USA), The Independent (UK), The Times of India, La Recherche (France), Science et Vie (France),...

## PUBLICATION LIST

### JOURNAL ARTICLES

1. S. Dégallier, L. Righetti, S. Gay and A. [Ijspeert](#). Toward simple control for complex, autonomous robotic applications: Combining discrete and rhythmic motor primitives. *Autonomous Robots*. 31:155–181, 2011.
2. A. Akbarimajd, M. Mili, and A. J. [Ijspeert](#). Analogy between Juggling and Hopping: Active object manipulation approach. *Advanced Robotics*. In press.
3. R. Ronsse, N. Vitiello, T. Lenzi, J. van den Kieboom, M. C. Carrozza, A. J. [Ijspeert](#) Human-robot synchrony: flexible assistance using adaptive oscillators. *IEEE Transactions on Biomedical Engineering*. In press.
4. Renaud Ronsse, Tommaso Lenzi, Nicola Vitiello, Bram Koopman, Edwin van Asseldonk, Stefano Marco Maria De Rossi, Jesse van den Kieboom, Herman van der Kooij, Maria Chiara Carrozza and Auke Jan Ijspeert, Oscillator-based assistance of cyclical movements: model-based and model-free approaches, *Medical and Biological Engineering and Computing*, 2011, DOI: 10.1007/s11517-011-0816-1
5. S. De Rossi, N. Vitiello, L. Tommaso, R. Ronsse, B. Koopman, A. Persichetti, F. Vecchi, A.J. [Ijspeert](#), He. van der Kooij, M.C. Carrozza. Sensing pressure distribution on a lower-limb exoskeleton physical human-machine interface. *Sensors*. 11(1), 207-227, 2011.
6. D. Ryczko, V. Charrier, A. [Ijspeert](#), and J.-M. Cabelguen. Segmental oscillators in axial motor circuits of the salamander: distribution and bursting mechanisms. *Journal of Neurophysiology*. 104:2677-2692, 2010.
7. S. Dégallier and A. [Ijspeert](#). Modeling Discrete and Rhythmic Movements through Motor Primitives: A Review, *Biological Cybernetics*, 103 (4), 319-338, 2010.
8. A. Spröwitz, S. Pouya, S. Bonardi, J. van den Kieboom, R. Möckel, A. Billard, P. Dillenbourg, A.J. [Ijspeert](#). Roombots: Reconfigurable Robots for Adaptive Furniture, *IEEE Computational Intelligence Magazine*, 5(3): 20-32, 2010.
9. L. Righetti, J. Buchli and A. J. [Ijspeert](#). Adaptive Frequency Oscillators and Applications, *The Open Cybernetics and Systemics Journal*, vol. 3, p. 64-69, 2009.
10. Andani. M.E., Bahrami F., Maralani P.J., and [Ijspeert](#) A.J., MODEM: a multi-agent hierarchical structure to model the human motor control system. *Biological Cybernetics*, 2009.
11. Gams A., [Ijspeert](#) A.J., Schaal S., and Lenarcic J.. On-line learning and modulation of periodic movements with nonlinear dynamical systems. *Autonomous Robots*, 27(1):3-23, July 2009.
12. Nandi G.C., [Ijspeert](#) A.J., Chakraborty P., Nandi A., Development of Adaptive Modular Active Leg (AMAL) using bipedal robotics technology, *Robotics and Autonomous Systems* 57 (6-7), pp. 603-616, 2009.
13. [Ijspeert](#) A.J., Central pattern generators for locomotion control in animals and robots: a review. *Neural Networks*, 21(4):642-653, 2008.
14. Pretto I., Ruffieux S., Menon C., [Ijspeert](#) A.J., and Cocuzza, S.. A point-wise model of adhesion suitable for real-time applications of bio-inspired climbing robot. *Journal of Bionic Engineering*, 5:98-105, 2008.
15. Buchli J. and [Ijspeert](#) A.J.. Self-organized adaptive legged locomotion in a compliant quadruped robot. *Autonomous Robots*, 25(4):331-347, 2008.
16. Buchli J., Righetti L., and [Ijspeert](#) A.J.. Frequency Analysis with a Nonlinear Dynamical System, *Physica D*, 237: 1705–1718, 2008.
17. Sproewitz A., Moeckel R., Maye J., [Ijspeert](#) A.J., Learning to move in modular robots using central pattern generators and online optimization. *International Journal of Robotics Research*. 27(3-4):423-443, 2008

18. Crespi A., Lachat D., Pasquier A., Ijspeert A.J. Controlling swimming and crawling in a fish robot using a central pattern generator. *Autonomous Robots*, 25(1-2), pp 3-13, 2008.
19. Crespi A. and Ijspeert A.J.. Online optimization of swimming and crawling in an amphibious snake robot. *IEEE Transactions on Robotics*, 24(1), 2008 pp 75-87.
20. Chevallier S., Ijspeert A.J., Ryczko D., Nagy F. and Cabelguen J.-M., Organisation of the spinal central pattern generators for locomotion in the salamander: biology and modelling. *Brain Research Reviews*. 57(1), 2008, pp 147-161.
21. Tsakarakis N.G., Metta G., Sandini G., Vernon D., Beira R., Becchi F., Righetti L., Santos-Victor J., Ijspeert A.J., Carrozza M.C., and Caldwell D.G.. iCub - The Design and Realization of an Open Humanoid Platform for Cognitive and Neuroscience Research. *Journal of Advanced Robotics*, 21(10), 2007, pp 1151-1175.
22. Ijspeert A.J., Crespi A., Ryczko D., and Cabelguen J.M.. From swimming to walking with a salamander robot driven by a spinal cord model. ***Science*, 315(5817):1416-1420, 2007.**
23. Sommacal L., Melchior P., Dossat A., Petit J., Cabelguen J.M., Oustaloup A. and Ijspeert A.J., Improvement of the Muscle Fractional Multimodel for Low Rate Stimulation, *Biomedical Signal Processing & Control*, 2 (3), July 2007, pp 226-233.
24. Webb B., Wessnitzer J., Bush S., Schul J., Buchli J., and Ijspeert AJ. Resonant neurons and bushcricket behaviour. *Journal of Comparative Physiology*, 193(2), 2007 pp 285-288.
25. Buchli J., Righetti L. , and Ijspeert A.J.. Engineering entrainment and adaptation in limit cycle systems - from biological inspiration to applications in robotics. *Biological Cybernetics*, 95(6):645-664, 2006.
26. Hohl L., Tellez R., Michel O., and Ijspeert A.J.: Aibo and Webots: Simulation, Wireless Remote Control, and Controller Transfer, *Robotics and Autonomous Systems*, 54(6), 2006, pp 472-485. **This article was 6th on the list of hottest 25 articles from the journal of Robotics and Autonomous Systems in the period of April - June 2006 (see <http://top25.sciencedirect.com>).**
27. Righetti L., Buchli, J. and Ijspeert A.J.: Dynamic Hebbian learning in adaptive frequency oscillators, *Physica D*, 216(2), 2006 pp 269-281.
28. Moeckel R., Jaquier C., Drapel K., Dittrich E., Upegui A., Ijspeert A.J.: Exploring adaptive locomotion with YaMoR, a novel autonomous modular robot with Bluetooth interface, *Industrial Robot*, 33(4), 2006, pp 285-290.
29. Menzer F., Buchli J., Howard D.M, and Ijspeert A.J.: Nonlinear modelling of double and triple period pitch breaks in vocal fold vibration. *Logopedics Phoniatrics Vocology*, 31, 2006, pp 36-42.
30. Ijspeert A.J., Crespi A. and Cabelguen, J.M.: Simulation and Robotics Studies of Salamander Locomotion: Applying Neurobiological Principles to the Control of Locomotion in Robots, *Neuroinformatics*, 3(3), 2005, pp 171-195.
31. Crespi A., Badertscher A., Guignard A. and Ijspeert A.J.: AmphiBot I : an amphibious snake-like robot, *Robotics and Autonomous Systems*, vol. 50, issue 4, 2005, pp 163-175. **This article is 3rd on the list of most cited articles from the journal of Robotics and Autonomous Systems in the period of 2004-2009.**
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