

Jean-Charles Delvenne

Assistant professor in Applied Mathematics

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Date of birth: Oct 6, 1979

Belgian, married

Education

- Sept 2010 Assistant professor at *Université catholique de Louvain*, Louvain-la-Neuve, Belgium
- Sept 2009 – Aug 2010 Assistant professor at *Facultés Universitaires Notre-Dame de la Paix*, Namur, Belgium
- Nov 2007 – Aug 2009 Postdoctoral fellow at *Université catholique de Louvain*, Louvain-la-Neuve, Belgium
Host: Prof. Vincent D. Blondel
- May 2008 Visitor at the *Royal Institute of Technology (KTH)*, Stockholm, Sweden
Hosts: Profs. Karl Henrik Johansson and Henrik Sandberg
- Oct 2006 – Nov 2007 Postdoctoral fellow at the *Imperial College London*, UK
Host: Prof. Sophia Yaliraki
- Jan 2006 – Sept 2006 Postdoctoral fellow at *Caltech*, Pasadena, USA
Hosts: Profs. Leonard Schulman and Richard Murray
- Oct 2005 – Dec 2005 Visitor at the *University of Padua*, Italy
Host: Prof. Sandro Zampieri
- Oct 2002 – Dec 2005 Graduate student at the *Université catholique de Louvain*, Belgium
Thesis: *Dynamics, Information and Computation*
Advisor: Prof. Vincent D. Blondel
- Sept 1997 – Juin 2002 Undergraduate student in Applied Mathematics at the *Université catholique de Louvain*, Louvain-la-Neuve, Belgium
Honours degree ‘Summa Cum Laude’
Master thesis: *Tilings, Automata and Dynamical Systems*
Advisor: Prof. Vincent D. Blondel

Scientific Interests

Large graphs and networks, complex systems
Information theory, algorithmic information theory and statistical mechanics
Quantized control, distributed control
Computability and complexity
Symbolic dynamics, cellular automata, language theory
Computation in dynamical systems, unconventional computation
Strong taste for interdisciplinarity

Journal articles

- J.-Ch. D. and Anne-Sophie Libert. Centrality measures and thermodynamic formalism for complex networks. Submitted.
- Renaud Lambiotte, J.-Ch. D. and Mauricio Barahona. Dynamics and Modular Structure in Networks. Submitted.
- Henrik Sandberg, J.-Ch. D. et John C. Doyle. On Lossless Approximations, Fluctuation-Dissipation, and Limitations of Measurements. *IEEE Transactions on Automatic Control*. To appear.

- Cédric Langbort and J.-Ch. D. Distributed Design Methods for Linear Quadratic Control and Their Limitations. *IEEE Transactions on Automatic Control*, 55(9), pp. 2085-2093, 2010.
- Paul Bell, J.-Ch. D., Raphaël Jungers and Vincent D. Blondel. The Continuous Skolem-Pisot Problem: On the Complexity of Reachability for Linear Ordinary Differential Equations. *Theoretical Computer Science*, 411(40-42), pp. 3625-3634, 2010.
- J.-Ch. D., Sophia N. Yaliraki and Mauricio Barahona. Stability of Graph Communities Across Time Scales. *Proc Natl Acad Sci USA*, 107(29), pp. 12755-12760, 2010.
- J.-Ch. D., Ruggero Carli and Sandro Zampieri. Optimal strategies in the average consensus problem. *Systems and Control Letters*, 58(10-11), pp. 759–765, 2009.
- J.-Ch. D. What is a universal computing machine? *Applied Mathematics and Computation*, 215(4), pp. 1368-1374, 2009.
- Julien M. Hendrickx, Brian D. O. Anderson, J.-Ch. D. and Vincent D. Blondel. Directed graphs for the analysis of rigidity and persistence in autonomous agents systems. *International Journal of Robust and Non-Linear Control*, 17 pp.960-981, 2007.
- J.-Ch. D., Petr Kůrka et Vincent D. Blondel. Computational universality in symbolic dynamical systems. *Fundamenta Informaticae*, 74(4), 463–490, 2006.
- J.-Ch. D. An optimal quantized feedback strategy for scalar linear systems. *IEEE Transactions on Automatic Control*, 51(2), 298–303, 2006.
- J.-Ch. D. and Vincent D. Blondel. Complexity of control on finite automata. *IEEE Transactions on Automatic Control*, 51(6), 977–986, 2006.
- J.-Ch. D. et Vincent D. Blondel. Quasiperiodic configurations and undecidable dynamics for tilings, infinite words and Turing machines. *Theoretical Computer Science*, 319:127–143, 2004.

Peer-reviewed conference articles

- Manuel Lopez-Martinez, J.-Ch. D and Vincent Blondel. Energy-aware Consensus Algorithms in Network Sampled Systems, *Proceedings of the 2nd IFAC Workshop on Distributed Estimation and Control in Networked Systems (Nec-Sys 2010)*, Annecy, France, 2010.
- Fabio Fagnani and J.-Ch. D., Democracy in Markov chains and its preservation under local perturbations. *Proceedings of the 49th IEEE Conference on Decision and Control (CDC 2010)*, Atlanta, USA, 2010.
- J.-Ch. D. and Tzvetan Ivanov. A Characterisation of Solution Sets of LTI Differential Equations, *Proceedings of the 48th IEEE Conference on Decision and Control (CDC 2009)*, Shanghai, China, 2009.
- J.-Ch. D. What is a universal computing machine? *Proceedings of the Conference on Unconventional Computation*, Vienna, Austria, 2008.
- J.-Ch. D., Henrik Sandberg and John C. Doyle. Thermodynamics of Linear Systems. *Proceedings of the European Control Conference*, Kos, Greece, 2007.
- J.-Ch. D., Ruggero Carli and Sandro Zampieri. Optimal strategies in the average consensus problem. *Proceedings of the 46th IEEE Conference on Decision and Control (CDC 2007)*, pp. 2498-2503, New-Orleans, USA, 2007.

Henrik Sandberg, J.-Ch. D. and John C. Doyle. Linear-quadratic-Gaussian heat engines. *Proceedings of the 46th IEEE Conference on Decision and Control (CDC 2007)*, pp. 3102-3107, New-Orleans, USA, 2007.

Henrik Sandberg, J.-Ch. D. and John C. Doyle. The Statistical Mechanics of Fluctuation-Dissipation and Measurement Back Action. *Proceedings of the American Control Conference*, New York, USA, 2007.

Cédric Langbort and J.-Ch. D. The price of distributed design in optimal control. *Proceedings of the 45th IEEE Conference on Decision and Control (CDC 2006)*, San Diego, USA, 2006.

J.-Ch. D., Petr Kůrka and Vincent D. Blondel. Computational universality in symbolic dynamical systems. Dans M. Margenstern, editeur, *Machines, Computation and Universality 2004*, Lecture Notes in Computer Science 3354, 104–115, Saint-Petersbourg, Russia, 2005.

Selected talks

- ANTWERP July 15, 2010 *Consensus, partial consensus, and communities*, at the workshop Algorithms and Dynamics over Networks, Torino.
- July 9, 2010 *The Logarithmic Quantiser is Not Optimal for LQ Control*, at the 19th International Symposium on Mathematical Theory of Networks and Systems (MTNS 2010), Budapest.
- Feb 18, 2010 *Random walks on graphs: what for?*, at the Colloquium MAPA, UCL, Louvain-la-Neuve.
- Dec 16–18, 2009 *A Characterisation of Solution Sets of LTI Differential Equations*, à la Conference on Decision and Control 2009, Shanghai, China.
- Oct 21–23, 2009 *Communities in Markov chains* at the Laboratoire d'Algorithmique et Image de Clermont, Université de Clermont-Ferrand, France.
- May 28–30, 2009 *Time Scales and Hierarchies in Large Graphs* at the conférence NET2009, Rome, Italie.
- March 18–20, 2008 *Arithmetics of consensus* at the 28th Benelux Meeting on Systems and Control, in Spa, Belgique.
- Dec 10–12, 2008 *Random walks and hierarchical community structure in complex networks*, at BCNet Workshop: Trends and Perspectives in Complex Networks, Barcelone, Espagne.
- Aug 25–28, 2008 *What is a universal computing machine?*, at the Conference on Unconventional Computation, à Vienne, Autriche.
- March 18–20, 2008 *Distributed design for linear quadratic control* au 27th Benelux Meeting on Systems and Control, in Heeze, Pays-Bas.
- March 13–14, 2008 *Clustering and time scales in graphs and Markov chains*, à la conférence Detection and Visualization of Communities in Large Complex Networks at the Université catholique de Louvain, Louvain-la-Neuve, Belgium.
- July 2–5, 2007 *Thermodynamics of Linear Systems*, at the European Control Conference 2007 in Kos, Greece.
- June 20–21, 2007 *Fast strategies in the average consensus problem*, au 3rd International Workshop on Networked Control Systems : Tolerant to Faults, Université de Nancy, France.
- Aug 14–18, 2006 *Control, information, and statistical mechanics*, at the conference Connections II à Caltech, Pasadena, CA, USA.
- July 24–26, 2006 *Quantized control for linear systems*, au 17th Symposium on Mathematical Theory of Networks and Systems (MTNS 2006), in Kyoto, Japan.

- July 1–5, 2006 *Turing-universal dynamical systems*, at the conférence Computability in Europe 2006, Swansea, Wales.
- July 18–22, 2005 *Decidability and computational universality in symbolic systems*, à la Visegrad Conference on Dynamical Systems, Prague, Czech Republic.
- July 11–14, 2005 *Optimal quantized feedback for scalar linear systems*, à la Sixth SIAM Conference on Control and its Applications, New Orleans, USA.
- June 27–28, 2005 *Computation on the Cantor set*, at the International Workshop on Computations on the continuum, Lisbonne, Portugal.
- March 22–24, 2005 *Quantized feedback on scalar linear systems* at the 24th Benelux Meeting on Systems and Control, à Houffalize, Belgique.
- Sept 21–26, 2004 *Computational universality in symbolic dynamical systems*, à l'International Conference on Machines, Computation and Universality, Saint-Petersbourg, Russia.
- July 5–9, 2004 *Complexity of control on finite automata*, au Symposium on Mathematical Theory of Networks and Systems (MTNS 2004), Leuven, Belgique.
- March 17–19, 2004 *Complexity of control on automata*, au 23rd Benelux Meeting on Systems and Control, in Eindhoven, Netherlands.
- March 19–21, 2003 *Dynamics and computation*, at the 22nd Benelux Meeting on Systems and Control, in Lommel, Belgium.
- June 24–26, 2002 *Turing machines and tilings*, at the Workshop on Tilings and \mathbb{Z}^2 Plane, Paris, France.

Prix

IBM Belgium/F.R.S-FNRS Prize for the best thesis in computer science in 2006.