

Hugues BERRY

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Project-Team Combining
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1 Education and Experience

1.0.1 Education

- **Habilitation thesis/Habilitation a Diriger les Recherches**, June 2008
Speciality: Bioinformatics
Title: Modelling Complex Biological Systems: Examples in Computational Cell Biology, Computational Neuroscience and applications to Computer Science
Ecole Doctorale d'Informatique - Paris-Sud University - Orsay
Jury: *F. Alexandre* (Project-team Cortex, INRIA, Nancy, France, Rapporteur), *E. Ben Jacob* (School of Physics and Astronomy, Tel Aviv University, Israel, Rapporteur), *K. Burrage* (Computation Laboratory, University of Oxford, Oxford, UK and Institute for Molecular Biology, University of Queensland, Brisbane, Australia, Rapporteur), *H. de Jong* (Project-Team Helix, INRIA Rhône-Alpes, Grenoble, France), *J. Demongeot* (TIMC-IMAG Laboratory, University Joseph Fourier, Grenoble, France), *A. Lesne* (IHES, Bures-sur-Yvette and LPTMC, Univ. P & M. Curie, Paris, France), *O. Temam* (Project-Team Alchemy, INRIA Saclay-Île-de-France, France).
- **Ph.D. Biophysics/Biochemistry**, 1996–1999
Supervisor: Pr. V. Larreta-Garde
Université de Technologie de Compiègne, France
“Avec Félicitations du jury”
- **Master (“D.E.A”) of Enzyme Technology**, 1994–1995
Supervisor: Pr. V. Larreta-Garde
Université de Technologie de Compiègne, France
Mention Très Bien; Classement: 1er (/110).
- **Engineer Diploma**, 1989–1994
Université de Technologie de Compiègne, France

1.0.2 Research Experience

- **Research Professor**
INRIA - Rhone Alpes, University of Lyon, Lyon - France
From October 2009
Modeling Complex Biological Systems : Computational Cell Biology, Computational Neuroscience and applications to Computer Science; Cortex-inspired computing systems
- **Research Professor**
INRIA - Saclay, Project-Team Alchemy - France
September 2004–September 2009
Computational neuroscience and biology: Modelling and inspiration for computer science. Structure and

dynamics in complex biological neural networks; Memory and synaptic plasticity; Cortex-inspired computing systems.

- **Associate Professor**

ERRMECe - Université de Cergy-Pontoise - France
1999-2004

Modeling and Simulation of complex biochemical systems; Biomathematics of cell adhesion and tumor dissemination; Discrete stochastic simulations and fluctuations in cellular systems; Nonequilibrium phase transitions and Monte Carlo simulations.

- **Ph. D. Student** Université de Technologie de Compiègne - France
1996-1999

Biochemistry/Biophysics; Extracellular matrix proteolysis in tumor dissemination; Experimental approaches (small-angle neutron scattering, complex enzyme kinetics) and modelling (percolation, gel/sol transition).

2 Publications

2.1 Articles & Conference Proceedings

- see publication list at the end for details -

Article type	# articles
Book Chapters	1
Peer-Reviewed Journals	27
Peer-Reviewed Internatl. Conferences	21
Peer-Reviewed Workshops & Abstracts	12
Patents	1

2.2 Popular Science

- “Du chaos dans les neurones” (chaos in neurons), with B. Cessac, *Pour La Science*, Nov. 2009, 385:108-115 (in french). Also an online article on the *i(nterstices* web journal (<http://interstices.info/chaosneurones>).
- “Quand les bactéries se mêlent du calcul des ordinateurs...” (about bacteria and computer calculations) : a short vulgarization text plus a longer podcast on the *i(nterstices* web journal (http://interstices.info/jcms/c_40644/).
- “Alchimistes de l’informatique” (computer alchemists), *La Recherche*, may 2008.
- “Why computers are like the weather”, *NewScientist*, July 2005.

3 Supervised Students

- **Jules Lallouette** (Ph. D. Student) - 2011-Present - Topics: *Transport in complex networks: the case of mixed neuron/glial cell networks.*
- **Pierre Gabriel** (Postdoctoral researcher) - 2011-Present - Topics: *Mathematical modeling of protein aggregation and aging in E coli.* Funded by the French National Agency for Research (ANR), Project Pagdeg .

- **Jean-Marie Gomes** (Master 2 Student) - 2010 - 2011 - Topics: *The bidirectional response of cortico-striatal synapses to 2-arachidonyl-glycerol*.
- **Anne-Sophie Coquel** (Ph. D. Student) - 2009-Present - Co-Supervised with A. Lindner (TAMARA's Lab, INSERM U571, Necker-Enfants Malades Medical School, Paris, France). Topics: *Deciphering the molecular mechanisms underlying the role of protein aggregation in aging of E. coli*.
- **Zayna Chaker** (Master 2 student), April-July 2010 - Topics: *Protein aggregation underlying bacterial aging : Computer simulations*. Master 2 AIV (Univ. Paris 5 Descartes).
- **Fei Jiang** (Ph.D. Student) - 2006-2009 - INRIA Futurs, Orsay & Orsay University (Co-Supervised with M. Schoenauer (TAO, INRIA Futurs, Saclay, France). Topics: *Evolution and optimization of large neural networks*. Ph.D. defended and completed: December 16, 2009
- **Benoit Siri** (Ph.D. Student) - 2005-2008 - INRIA Futurs, Orsay & Orsay University (Full supervision), Topics: *Topology-dynamics-learning interactions in complex bioinspired neural networks*, Ph.D. funded thanks to a contract with the French National Agency for Research (ANR) to H. Berry (call "Jeunes Chercheurs / Jeunes Chercheuses", Project ASTICO). Ph.D. defended and completed: December 18th, 2008.
- **Edouard Garnier de Labareyre** (Ecole polytechnique, Internship, co-supervised with O. Temam, Alchemy, INRIA Saclay) - April-July 2008 - Topics: *Emergence of computation and abstraction functions on biological neural networks*.
- **Delphine Pellenc** (Ph. D. Student; now a postdoc researcher at University of Reading, UK) - 2002-2005 - Université de Cergy-Pontoise (Co-Supervision with O. Gallet), Topics: *Adsorption-induced fibronectin self-assembling: experimental characterization on hydroxyapatite and study by numerical simulation*. Ph.D. defended and completed: October 21st, 2005.
- **Geoffrey Caron-Lormier** (Master (D.E.A.) Student; now a Ph. D. Student in Rennes, UMR CNRS 6552 E.V.E) - September 2001-July 2002 - Université de Cergy-Pontoise (Full Supervision), Topics: *Biomathematics of the early steps of integrin signaling pathway: FAK and Src auto- and co-activation*.

4 Grants and Funding

(> 5 k€ grants).

- "Astrocytic regulation of neuronal network activity" 2012-2103, Research Networks Program in Computational Neurosciences and Computational Cognitive Sciences of the High Council for Scientific and Technological Cooperation between France-Israel, with E Ben-Jacob and Y Hanein (Tel Aviv Univ, Israel). Supervisors: H. Berry (French side) and Y. Hanein (Israeli side) Total amount funded : 160 k€.
- "NeoBG" (towards a biologically realistic theory of reinforcement learning), 2011-2012, Appel Projets exploratoires pluridisciplinaires inter-instituts (PEPII) CNRS - Supervisor : B. Delord (Univ. P & M Curie, Paris). With Ph. Faure and L. Venance (College de France, Paris). Total amount funded : 24 k€.
- "RASMOT": A one year (2010) research project funded by the call "Programme interdisciplinaire CNRS Neuro-IC : Neurosciences et neuroinformatique computationnelle". We explore the possibility to use recent bioinspired machine learning techniques to learn and represent in a neural network an optimal controller mimicking human brain-like motor control. Supervisor: E. Guigon (ISIR, CNRS, Univ. P&M Curie Paris). Total amount funded : 24 k€.

- “PAGDEG” (Causes and consequences of protein aggregation in cellular degeneration): a three-year project (2009-20012) funded by the French National Agency for Research (ANR), Call “PIRIBIO”.
Supervisor: A. Lindner (INSERM, Paris) ; Other participants: Y. Chen (ENS Paris), L. Moisan (Univ. Paris 5). Total amount funded: 450 k€.
- “Action d’Envergure” ColAge: an INRIA-INSERM joint grant (3 years) on modeling and simulation of systems biology (starting July 2008). Supervisor: H. Berry. Total amount funded (for 2008 and 2009): 291 k€.
Other participants: F. Taddei, A. Lindner (INSERM, Paris), H. Geiselmann (CNRS Grenoble), H. de Jong, D. Roppers (INRIA Grenoble), M. Chaves, JL Gouze (INRIA Sophia), G. Batt, F. Fages (INRIA Rocquencourt).
- “AMYBIA” (Aggregating Myriads of Bio-Inspired Agents); a two-year project (2008-2009) funded by an INRIA ARC (Collaborative Research Initiative).
Supervisor: N. Fatès (Project-Team MAIA, INRIA Nancy-Lorraine); Other participants: B. Girau (Project-Team Cortex, INRIA Nancy-Lorraine). Total amount funded: 60 k€.
- “MACACC” (Modelling cortical activity and analysis of the cerebral code); a two-year project (2008-2009) funded by an INRIA ARC (Collaborative Research Initiative).
Supervisor: B. Cessac (Institut Non-Linéaire de Nice and Project-Team Odyssee, INRIA Nice); Other participants: M. Clerc, O. Faugeras, P. Kornprobst, T. Papadopoulo (Project-Team Odyssee, INRIA Nice), T. Vieville (Project-Team Cortex, INRIA Nancy), F. Chavane, G. Masson (DyVA team, Mediterranean Institute for Cognitive Neuroscience, Marseille), P. Chossat, G. Lebeau (Lab. J.A. Dieudonné, Univ. Nice), F. Grammont (Neurobiology Lab., Univ. Nice). Total amount funded: 66 k€.
- “ASTICO” (Apprentissage dans les SysTemes biologiques COMplexes / Learning in complex biological systems); a three-year project (2005-2008) funded by the French National Agency for Research (ANR), (Appel a Projet “Jeunes Chercheurs” / Young Researchers).
Supervisor: H. Berry; Other participants: B. Cessac (Non Linear Institute, UMR 6618 CNRS, Nice), B. Delord (ANIM, U742 INSERM/UPMC, Paris), M. Quoy (ETIS, UMR 8051 CNRS, Cergy-Pontoise), O. Temam (INRIA, Project Alchemy, Orsay). Total amount funded: 110 k€.

5 Conference Organization and Editorial activities

5.0.1 Conference Organization

- Co-organizer of the Workshop “From Amorphous to Spatial Computing”, July 7-8, 2008, Paris.
- Member of the organization committee of the CNRS-INRA thematic school “**EIEFB**: Ecole interdisciplinaire d’échanges et de formation en biologie”, Berder Island (Morbihan, France), for 2008, 2009 and 2010 (<http://www.lptmc.jussieu.fr/users/lesne/berder2008.html>). Main Organizer: Annick Lesne (LPTMC, Univ. P.M. Curie, Paris)
- Main organizer of the Autumn School/Conference **NeuroComp 2007** on Computational Neurosciences, 14-16 November, Paris (<http://www.neurocomp.fr/2007.html>).
- Co-organizer of a one-day colloquium on Amorphous Computing, INRIA Orsay, France, July 18, 2007.

5.0.2 PhD / HdR committees

- HdR (Habilitation a diriger les recherches) :

- A. Stephanou, “Une approche computationnelle pour l’étude de processus morphogénétiques”, December 15, 2011 (examiner)
- PhD:
 - R. Martinez “Dynamique des systèmes cognitifs et des systèmes complexes : étude du rôle des délais de transmission de l’information” Lyon, September 26, 2011 (examiner).
 - L. Alecu “Structuration de traitements visuels par la boucle sensorimotrice : Une approche neuromimétique d’inspiration corticale”, Nancy, June 30, 2011 (examiner)
 - A. Demarez, “Investigating proteostasis and ageing of Escherichia coli using spatio-temporal algorithms”, January 31, 2011, Univ. Paris Descartes (reviewer).
 - T. Girod, “Un modèle d’apprentissage multimodal pour un substrat distribué d’inspiration corticale”, November 10, 2010, Univ. Nancy 1 (reviewer).
 - A. Coulon, “Stochastocité de l’expression génique et régulation transcriptionnelle – Modélisation de la dynamique spatiale et temporelle des structures multiprotéiques”, July 01 2010 Univ. Lyon 1, 2010 (examiner).
 - M. Valvassori, “Modélisation et programmation d’ordinateurs amorphes: de l’ordinateur amorphe à la machine Blob”, July 10, 2009, Univ. Paris 8 (reviewer)
 - M. Ambard, “Influence de l’inhibition synaptique sur le codage de l’information par les cellules mitrales du bulbe olfactif”, June 08, 2009, Univ. Nancy 1 (reviewer)
 - J.-B. Rouquier, “Robustesse et émergence dans les systèmes complexes: le cas de automates cellulaires”, Dec. 08 2008, ENS Lyon (examiner)
 - David Meunier, “Une modélisation évolutionniste du liage temporel”, Oct. 19, 2007, Université Lumière Lyon 2. (examiner).
- Participation in AERES evaluation committees
 - UR protection radiologique de l’homme, Institut de radioprotection et de sûreté nucléaire, IRSN, 2010

5.0.3 Editorial / Review activities

- Member of the SPECIF committee (best French PhD in Computer Science), 2011-2014.
- Participation in selection committees (for assistant professors)
 - position MCF 0333, chaire CNRS/UCP section 27-61, University Cergy-Pontoise (Computer Science Dept), 2011
 - position MCF 1706, section 64, University Cergy-Pontoise (Life Science Dept), 2010
 - position MCF 1701 , section 27-61, University Cergy-Pontoise (Computer Science Dept), 2010
 - position MCF 283, section 65-27, Evry University, 2009
 - position MCF 0744 , section 26, University Grenoble 1, 2009
- Reviewer for calls for funding
 - ANR (French National Research Agency): Calls “Programme Blanc” (2008 & 2011) and “SysComm” (2008 & 2009)
 - Call COFECUB 2011,
 - Call DIM (Domaine d’intérêt majeur) LSC (Logiciel et systèmes complexes) 2011, Région Ile de France
- Review Editor for *Frontiers in Neurobotics*

5.0.4 Administrative tasks

- Member of the INRIA Evaluation Committee (Commission d’Evaluation) (2011-2015).
- Member of the INRIA Administrative Committee (Commission Administrative Paritaire) (2011-2015).
- Member of the “Scientific Commission” (commission scientifique) of the INRIA Saclay-Ile-de-France research centre (2008).

5.0.5 Prizes and Awards

Conference Fellowship of the United Engineering Foundation (Mount Vernon, VA, USA) for the paper: Berry *et al.* (1998) *Annals of the New York Academy of Sciences*, **864**, 198–202. This price is awarded at each biennial “Enzyme Engineering” Conference (the biggest conference in enzyme technology) and rewards the best paper from a young scientist.

Hugues BERRY

Complete Publication List

Almost all the articles below can be downloaded at
<http://www.inrialpes.fr/Berry/PublishHB.html>

Book Chapters

- [1] Berry, H., (2008). Nonequilibrium phase transition in scattered cell communities coupled by auto/paracrine-like signalling. In Pollack, G. and Chin, W.-C., eds., *Phase transitions in cell biology*, pages 23–41. Springer Verlag.

Publications in Peer-Reviewed Journals

- [1] Naudé, J., Paz, J., Berry, H. and Delord, B., (2012). A theory of rate coding control by intrinsic plasticity effects. *PLoS Comput. Biol.*, **8**(1):e1002349.
- [2] Berry, H. and Chaté, H., (2011). Anomalous subdiffusion due to obstacles : A critical survey. Submitted, URL www.arxiv.org/abs/1103.2206v1.
- [3] De Pittà, M., Volman, V., Berry, H. and Ben-Jacob, E., (2011). A tale of two stories: astrocyte regulation of synaptic depression and facilitation. *PLoS Comput. Biol.*, **7**(12):e1002293. Preprint HAL: inria-00633588.
- [4] Berry, H. and Fatès, N., (2011). Robustness of the critical behavior in the stochastic greenberg-hastings cellular automaton model. *Int. J. Unconv. Comput.*, **7**(1–2):65–85.
- [5] Goldberg, M., De Pittà, M., Volman, V., Berry, H. and Ben-Jacob, E., 08 (2010). Nonlinear gap junctions enable long-distance propagation of pulsating calcium waves in astrocyte networks. *PLoS Comput Biol*, **6**(8):e1000909.
- [6] Genet, S., Sabarly, L., Guigon, E., Berry, H. and Delord, B., (2010). Dendritic signals command firing dynamics in a mathematical model of cerebellar purkinje cells. *Biophys. J.*, **99**:427–436.
- [7] De Pittà, M., Goldberg, M., Volman, V., Berry, H. and Ben-Jacob, E., (2009). Glutamate regulation of calcium and IP3 oscillating and pulsating dynamics in astrocytes. *Journal of Biological Physics*, **35**(4):383–411.

This article has been selected for the Faculty of 1000 Biology; <http://www.f1000biology.com/article/id/1163674/evaluation>.

- [8] Lavelle, C., Berry, H., Beslon, G., Ginelli, F., Giavitto, J., Kapoula, Z., Le Bivic, A., Peyrieras, N., Radulescu, O., Six, A., Thomas-Vaslin, V. and Bourguine, P., (2008). From molecules to organisms: towards multiscale integrated models of biological systems. *Theoretical Biology Insights*, **1**:13–22.
- [9] Siri, B., Berry, H., Cessac, B., Delord, B. and Quoy, M., (2008). A mathematical analysis of the effects of hebbian learning rules on the dynamics and structure of discrete-time random recurrent neural networks. *Neural Computation*, **20**(12):2937–2966.
- [10] Siri, B., Quoy, M., Cessac, B., Delord, B. and Berry, H., (2007). Effects of hebbian learning on the dynamics and structure of random networks with inhibitory and excitatory neurons. *Journal of Physiology (Paris)*, **101**(1–3):136–148.
e-print: <http://arxiv.org/abs/0706.2602>.
- [11] Berry, H. and Temam, O., (2007). Modeling self-developing biological neural networks. *Neurocomputing*, **70**(16–18):2723–2734.
- [12] Delord, B., Berry, H., Guigon, E. and Genet, S., (2007). A new principle for information storage in an enzymatic pathway model. *PLoS Computational Biology*, **3**(6):e124.
- [13] Gracia Pérez, D., Berry, H. and Temam, O., (2006). The practicality dimension of sampling. *IEEE micro*, **26**:14–28.
- [14] Berry, H. and Quoy, M., (2006). Structure and dynamics of random recurrent neural networks. *Adaptive Behavior*, **14**:129–137.
- [15] Pellenc, D., Berry, H. and Gallet, O., (2006). Adsorption-induced fibronectin aggregation and fibrillogenesis. *Journal Colloid Interface Science*, **298**:132–144.
- [16] Berry, H., Gracia Pérez, D. and Temam, O., (2006). Chaos in computer performance. *CHAOS*, **16**:013110.
e-print: arXiv:nlin.AO/0506030; Hal inria: inria-00000109.
- [17] Pellenc, D., Gallet, O. and Berry, H., (2005). Adsorption-induced conformational changes in protein diffusion-aggregation surface assemblies. *Physical Review E*, **72**:051904.
- [18] Caron-Lormier, G. and Berry, H., (2005). Amplification and oscillations in the fak/src kinase system during integrin signaling. *Journal of Theoretical Biology*, **232**:235–248.
- [19] Berry, H., (2003). Chaos in a bienzymatic cyclic model with two autocatalytic loops. *Chaos, Solitons & Fractals*, **18**:1001–1014.

- [20] Berry, H., (2003). Nonequilibrium phase transition in a self-activated biological network. *Physical Reviews E*, **67**:031907.
- [21] Berry, H., (2002). Monte-carlo simulations of enzyme kinetics in two dimensions: fractal kinetics and spatial segregation. *Biophysical Journal*, **83**:1891–61901.
- [22] Larreta Garde, V. and Berry, H., (2002). Modeling extracellular matrix degradation balance with proteinase / transglutaminase cycle. *Journal of Theoretical Biology*, **217**:105–124.
- [23] Di Martino, P., Gagniere, H., Berry, H. and Bret, L., (2002). Antibiotic resistance and virulence properties of pseudomonas aeruginosa strains from ventilated patients with pneumonia in intensive care units: comparison with imipenem resistant extra-respiratory tract isolates from uninfected patients. *Microbes Infections*, **4**:613–620.
- [24] Berry, H., Pelta, J., Lairez, D. and Larreta-Garde, V., (2000). Gel-sol transition can describe the proteolysis of extracellular matrix gels. *Biochimica Biophysica Acta*, **1524**:110–117.
- [25] Pelta, J., Berry, H., Fadda, G., Pauthe, E., and Lairez, D., (2000). Statistical conformation of human plasma fibronectin. *Biochemistry*, **39**:5146–5554.
- [26] Berry, H. and Larreta Garde, V., (1999). Oscillatory behavior of a simple kinetic model for proteolysis during cell invasion. *Biophysical Journal*, **77**:655–665.
- [27] Berry, H., Débat, H. and Larreta Garde, V., (1999). Oxygen concentration determines regiospecificity in soybean lipoxygenase-1 reaction via a branched kinetic scheme. *Journal of Biological Chemistry*, **273**:2769–2776.
- [28] Berry, H., Débat, H. and Larreta Garde, V., (1997). Excess substrate inhibition of soybean lipoxygenase-1 is mainly oxygen-dependent. *FEBS Letters*, **408**:324–326.

Publications in Peer-Reviewed International Conference Proceedings

- [1] Hashmi, A., Berry, H., Temam, O. and Lipasti, M., June (2011). Automatic abstraction and fault tolerance in cortical microarchitectures. In *38th ACM/IEEE International Symposium on Computer Architecture, ISCA 2011*. San Jose, CA, USA.
- [2] Auras, D., Girbal, S., Berry, H., Temam, O. and Yehia, S., Oct. (2010). Memory interface for multi-purpose multi-stream accelerators. In *International Conference on Compilers, Architectures and Synthesis for Embedded Systems, CASES 2010*. Scottsdale, AZ, USA.

- [3] Auras, D., Girbal, S., Berry, H., Temam, O. and Yehia, S., June (2010). CMA: Chip multi-accelerator. In *8th IEEE Symposium on Application Specific Processors, SASP 2010*. Anaheim, CA, USA.
- [4] Vlassopoulos, N., Fates, N., Berry, H. and Girau, B., June (2010). An FPGA design for the stochastic greenberg-hastings cellular automata. In Smari, W., ed., *The 2010 International Conference on High Performance Computing & Simulation, HPCS 2010*, pages 565–574. IEEE, Caen, France.
- [5] Fates, N. and Berry, H., September (2010). Critical phenomena in a discrete stochastic reaction-diffusion medium. In Peper, F., ed., *Fourth International Workshop on Natural Computing, IWC 2009*, volume 2 of *Proceedings in Information and Communications Technology*, pages 141–148. Springer, Himeji, Japan. ISSN: 1867-2914.
- [6] Jiang, F., Berry, H. and Schoenauer, M., June (2009). The impact of network topology on self-organizing maps. In *World Summit on Genetic and Evolutionary Computation, GECS-2009*. Shanghai, China.
- [7] Yehia, S., Girbal, S., Berry, H. and Temam, O., February (2009). Reconciling specialization and flexibility through compound circuits. In *15th International Symposium on High-Performance Computer Architecture, HPCA*. Raleigh, North Carolina.
- [8] Jiang, F., Berry, H. and Schoenauer, M., September (2008). Supervised and unsupervised evolutionary learning of echo state networks. In *10th International Conference on Parallel Problem Solving From Nature, PPSN-2008*. Dortmund, Germany.
- [9] Jiang, F., Berry, H. and Schoenauer, M., July (2008). Unsupervised learning of echo state networks: Balancing the double pole. In *Genetic and Evolutionary Computation Conference, GECCO-2008*. Atlanta, GA, USA. 2-page abstract.
- [10] Jiang, F., Berry, H. and Schoenauer, M., October (2007). Optimizing the topology of complex neural networks. In *European Conference on Complex Systems, ECCS 2007*. Dresden, Germany.
- [11] Siri, B., Berry, H., Cessac, B., Delord, B. and Quoy, M., October (2007). Local learning rules and bifurcations in the global dynamics of random recurrent neural networks. In *European Conference on Complex Systems, ECCS 2007*. Dresden, Germany.
- [12] Siri, B., Berry, H., Cessac, B., Delord, B. and Quoy, M., June (2006). Topological and dynamical structures induced by hebbian learning in random neural networks. In *International Conference on Complex Systems, ICCS 2006*. Boston, MA, USA.

- [13] Gracia Pérez, D., Berry, H. and Temam, O., December (2005). Budgeted region sampling (beers): Wisely allocating simulated instructions for a better accuracy/speed/applicability tradeoff. In *5th IEEE International Symposium on Signal Processing and Information Technology*. Athens, Greece.
- [14] Berry, H. and Temam, O., (2005). Characterizing self-developing biological neural networks: A first step towards their application to computing systems. In *Proc. International Work-conference on Artificial Neural Networks, IWANN, June 2005, Barcelona, Spain*, Lecture Notes Computer Science, **3512**, 306–317.
e-print: arXiv:q-bio.NC/0505021; Hal inria: inria-00000024.
- [15] Pellenc, D., Gallet, O. and Berry, H., July (2005). How do surface- and neighbour-induced conformational changes affect the morphological properties of diffusion-aggregation driven surface-assemblies? In *IMACS World Congress 2005 for Scientific Computation, Applied Mathematics and Simulation*. Paris, France.
- [16] Pellenc, D., Gallet, O. and Berry, H., July (2005). Two-dimensional protein aggregation: Effect of surface- and neighbour-induced conformational changes. In *European Conference on Mathematical and Theoretical Biology (ECMTB)*. Dresden, Germany.
- [17] Caron-Lormier, G. and Berry, H., August (2003). Amplification and oscillations in the fak/src kinase system during integrin signaling. In *International Conference on Mathematical Biology 2003*. Dundee, Scotland.
- [18] Berry, H., Pauthe, E., Gallet, O. and Larreta Garde, V., (1998). Proteolysis of aggregated fibronectin: a model for in vivo matrix degradation. In *Proc. Enzyme Engineering XIV, Oct. 1997, Beijing, China*, Annals of the New York Academy of Sciences, **864**, 198–202.
This paper won the Conference Fellowship, awarded by the United Engineering Foundation, Mount Vernon, VA, USA.
- [19] Pauthe, E., Dauchez, M., Berry, H., Berjot, M., Monti, J., Alix, A. and Larreta-Garde, V., (1998). Enzymatic and structural approaches of thermolysin mechanism in glycerol containing media. In *Proc. Enzyme Engineering XIV, Oct. 1997, Beijing, China*, Annals of the New York Academy of Sciences, **864**, 458–462.
- [20] Berry, H., Debat, H. and Larreta Garde, V., (1996). A mechanistic and kinetic approach to the regulation by oxygen of soybean lipoxygenase-1 catalysis. In *Proc. Enzyme Engineering XIV, Oct. 1997, Beijing, China*, Annals of the New York Academy of Sciences, **864**, 366-370.
- [21] Berry, H., Lambert, C. and Larreta Garde, V., (1996). Influence of environment modifications on enzyme catalysis: Comparison of macromolecular

and molecular effects of cosolvents on lipoxygenase reactions. In *Proc. Enzyme Engineering XIII, Oct. 1995, San Diego, CA, USA*, Annals of the New York Academy of Sciences, **799**, 290–297.

Publications in Workshop Proceedings and Abstracts

- [1] Venance, L., Cui, Y., Paille, V., Delord, B., Genet, S. and Berry, H., (2011). Sub-second induction unveils a switch from nmda- to endocannabinoid-ltp (abstract). Society for Neuroscience, Washington, DC. Program No. 348.04. 2011 Neuroscience Meeting Planner. Online.
- [2] De Pitta, M., Volman, V., Berry, H. and Ben-Jacob, E., (2011). Astrocyte regulation of long-term synaptic plasticity (abstract). Society for Neuroscience, Washington, DC. Program No. 663.20. 2011 Neuroscience Meeting Planner. Online.
- [3] Berry, A., De Pitta, M., Volman, V. and Ben-Jacob, E., (2011). Astrocyte regulation of presynaptic plasticity (abstract). Society for Neuroscience, Washington, DC. Program No. 663.10. 2011 Neuroscience Meeting Planner. Online.
- [4] Delord, B., Naudé, J., Paz, J. and Berry, H. ., February (2011). Modeling the effects of intrinsic plasticity on rate coding (abstract). In *Computational and Systems Neuroscience (COSYNE) 2011*. Abstract.
- [5] Goldberg, M., De Pittà, M., Volman, V., Berry, H. and Ben-Jacob, E., (2010). On the determinants of calcium wave propagation distance in astrocyte networks: nonlinear gap junctions and oscillatory modes (abstract). In *40th annual meeting of the Society for Neuroscience*. Society for Neuroscience, San Diego, CA. Program No. 552.22. 2010 Neuroscience Meeting Planner. Online.
- [6] Girbal, S., Yehia, S., Berry, H. and Temam, O., January (2010). Stream and memory hierarchy design for multi-purpose accelerators. In *1st Workshop on SoC Architecture, Accelerators and Workloads (SAW-1)*. Bangalore, India.
- [7] Hashmi, A., Berry, H., Temam, O. and Lipasti, M., December (2009). Leveraging progress in neurobiology for computing systems. In *1st Workshop on New Directions in Computer Architecture (NDCA-1)*. New-York, New-York, USA.
- [8] Naudé, J., Genet, S., Berry, H., Paz, J. and Delord, B., 8-11 October (2008). A formalization of the computational impact of intrinsic plasticity. In *Proceedings of NeuroComp'08*, pages 19–26. Marseille, France.

- [9] Genet, S., Delord, B., Sabarly, L., Guigon, E. and Berry, H., 23-24 October (2006). On the propagation of Ca-dependent plateau and valley potentials in cerebellar Purkinje cells and how they drive the cell output. In *Proceedings of NeuroComp'06*, pages 167–170. Pont-à-Mousson, France.
- [10] Siri, B., Berry, H., Cessac, B., Delord, B., Quoy, M. and Temam, O., 23-24 October (2006). Learning-induced topological effects on dynamics in neural networks. In *Proceedings of NeuroComp'06*, pages 206–209. Pont-à-Mousson, France.
- [11] Berry, H. and Quoy, M., September (2005). Structure and dynamics of random recurrent neural networks. In *Active agents and their environments as dynamical systems*, workshop held during the VIIIth European Conference on Artificial Life (ECAL). University of Kent, Canterbury, Kent (UK).
- [12] Gracia Pérez, D., Berry, H. and Temam, O., June (2005). Edca: A new clustering approach for sampling. In *MoBS: Workshop on Modeling, Benchmarking, and Simulation*. Madison, Wisconsin, USA.

Patents

- [1] Yehia, S., Temam, O. and Berry, H., April (2010). Procédé pour la conception d'accélérateurs. Patent number FR2937762, Institut National de la Propriété Industrielle, France.

Invited Conferences

- [1] Berry, H., October, 27–28 (2011). Unconventional forms of plasticity: beyond the synaptic hebbian paradigm. In *Workshop on Development and Learning in Artificial Neural Networks, DevLeaNN, ISC-PIF, Paris, France*.
- [2] Berry, H., Sept, 23 (2011). Biochemistry and signaling in disordered and crowded cells : a new space odyssey. In *Seminars of the Modeling and Image Team, MAP5 (Paris 5 Laboratory for Applied Mathematics)*.
- [3] Berry, H., June, 06-10 (2011). Modeling disordered and crowded intracellular spaces with individual-based and hybrid models. In *2011 Summer Solstice Conference on Discrete Models of Complex Systems, Turku, Finland*.

- [4] Berry, H., May (2011). Biochemistry and signaling in disordered and crowded cells : a new space odyssey. In *31st seminar of the Francophone Society for Theoretical Biology (SFBT)*. Autrans, France.
- [5] Berry, H. and Venance, L., April (2011). The many faces of spike timing-dependent plasticity in basal ganglia. In *IXXI Lyon Seminar on the neurophysiology of cognition*. Lyon, France.
- [6] Berry, H., May (2010). A plastic contest : the effects of intrinsic plasticity on the dynamics of chaotic reservoir neural networks. In *2nd Workshop School Chaos and Dynamics in Biological Networks*. Cargese, Corsica, France.
- [7] Berry, H., June, 16-18 (2010). Biochemistry and signaling in disordered and crowded cells : a new space odyssey. In *2nd Summer Solstice International Conference on discrete models of complex systems, Solstice 2010, Nancy, France*.
- [8] Berry, H., June 23rd (2009). Cell biochemistry in cytoplasm with large molecular crowding : anomalous diffusion and bacterial aging. In *2nd Paris Workshop on MAS in Biology at meso or macroscopic scales, Paris, France*.
- [9] Berry, H., June 3rd (2009). Colage: A systems and synthetic biology approach to the control of bacterial growth and aging. In *2nd INRIA-NIH workshop on biomedical computing, Rocquencourt, France*.
- [10] Berry, H., March 25 (2009). Estimating the effects of intrinsic plasticity on neural network dynamics using a realistic model. In *INRIA-LJAD days on mathematics of living systems, Nice, France*.
- [11] Berry, H. and Temam, O., Jan. 23 (2009). La biologie a la rescousse de l'informatique ? In *Unithe ou cafe, INRIA Saclay, France*.
- [12] Berry, H., Jan. 13 (2009). The effects of hebbian learning on the structure and dynamics of chaotic neural networks. In *Univ. Wisconsin, Madison, invited by M. Lipasti, Dept. Electrical and Computer Engineering*.
- [13] Berry, H., Feb. 22nd (2008). Individual-based simulations for cell biochemistry in crowded environments. In *Talk given at the Institut des Systemes Complexes de Paris (ISC-PIF), Paris, France*.
- [14] Berry, H., Feb. 05-06th (2008). Influence of hebbian learning on the dynamics, topology and function of chaotic recurrent neural networks. In *Talk given at the "Journées du GdR Dycoec: Dynamique et controle de ensembles complexes", Nice, France*.
- [15] Berry, H., Jan. 25th (2008). Toward an agent-based simulation of aging in e. coli: diffusion-aggregation of chaperones. In *Talk given at the Programme d'Epigenomique, SMABio group, Evry, France*.

- [16] Berry, H., Dec. 04th (2007). Two examples of multi-agent simulation for cell biochemistry in crowded environments: enzyme reactions in membranes and aging in e. coli. In *Talk given at the Institut des Systmes Complexes Rhne-Alpin (IXXI), Lyon, France.*
- [17] Berry, H., May 15th (2007). The effects of hebbian learning on the topology and dynamics of recurrent neural networks: A mathematical and simulation study. In *Talk given at the conference Understanding Complex Systems 2007, University of Illinois at Urbana-Champaign, USA.*
- [18] Berry, H., April 09th (2007). Theoretical and simulation approaches to structure / dynamics / function relationships in biological neural networks. In *Talk given at the "Colloque ANR des projets SDV Jeunes Chercheurs", Nancy, France.*
- [19] Berry, H., March 27th (2007). Fluctuations in computer models of complex cellular systems. In *Talk given at the Ecole Interdisciplinaire d'Echange et de Formation en Biologie, Ile de Berder (Golf du Morbihan), France.*
- [20] Berry, H., February 26th (2007). Complex biological systems for spatial computing: self-organization and emergence. In *Talk given at the MAIA project-team, INRIA, Nancy, France.*
- [21] Berry, H., February 5th (2007). Neuro-inspiration pour les architectures de calcul: Auto-organisation et emergence. In *Talk given at the CORTEX project-team, INRIA, Nancy, France.*
- [22] Berry, H., November (2006). Structure complexe et émergence dans les réseaux de neurones biologiques. In *3ème Workshop Applications Médicales de l'Informatique: Nouvelles Approches, AMINA 2006.* Monastir, Tunisia.
- [23] Berry, H., Gracia Pérez, D. and Temam, O., June (2006). Complex dynamics of microprocessor performances during program execution: Regularity, chaos, and others. In *NKS2006 Wolfram Science Conference.* Washington D.C., USA.
- [24] Berry, H., Gracia Pérez, D. and Temam, O., March (2006). Caractérisation de la performance des microprocesseurs pendant l'exécution de programmes. In *9emes Rencontres du Non Linéaire.* Paris, France.
- [25] Berry, H., October (2005). Nonequilibrium phase transition in auto/paracrine cell signaling. In *symposia "Phase Transition in Cell Biology", held as part of the Fourth International Congress of Cellular and Molecular Biology.* Poitiers, France.