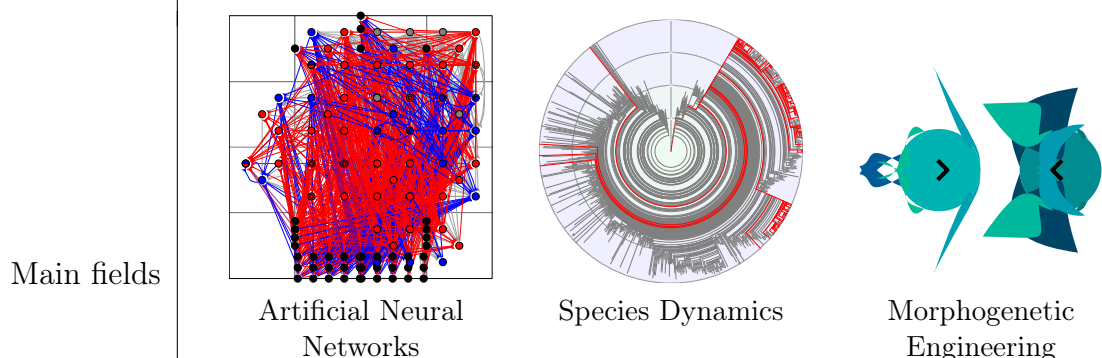


Dr. Kevin Godin-Dubois

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	🏠 Vrije Universiteit Amsterdam de Boelelaan 1081a, 1081HV Amsterdam, The Netherlands	♥️ godinduboisalife 🔍 Google Scholar R ⁶ ResearchGate
Position	Researcher in Evolutionary Robotics (since November 2022)	

Highlights

Research *Artificial Life: Cognition, Interaction & Language*



Output 1 journal article (*Artificial Life*)
5 international conference articles (*ALife*, *IEEE ALife*, *EvoAPP*)
5 international workshops short papers (*ALife*, *ECAL*)
Scientific software: ABrain, AMaze

Positions

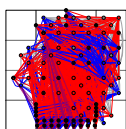
Postdoctoral 2022 - Present	Computer Science / Evolutionary Robotics “ <i>NeuroEvolution and Reinforcement Learning for Embodied Robots</i> ” Computational Intelligence Group - Vrije Universiteit Amsterdam, The Netherlands Supervisor: Dr. K. Miras (k.dasilvamirasdearaujo@vu.nl) Collaborators: Dr. A. Kononova (a.kononova@liacs.leidenuniv.nl)
Postdoctoral 2020 - 2022	Computer Science / Artificial Intelligence “ <i>Emergent cognitive architectures in virtual embodied robots</i> ” REVA Team, IRIT - Toulouse I University, France Supervisors: Pr. Y. Duthen (yves.duthen@irit.fr) Pr. S. Cussat-Blanc (sylvain.cussat-blanc@irit.fr)
PhD 2016-2020	Computer Science / Artificial Life “ <i>Environment-driven speciation: long term interactions in artificial plant communities</i> ” REVA Team, IRIT - Toulouse I University, France Supervisors: Pr. Y. Duthen (yves.duthen@irit.fr) Pr. S. Cussat-Blanc (sylvain.cussat-blanc@irit.fr)

Teaching	8 years (500+ hours)
Computer Science	Learning Machines Master 2 Projects Programming languages: Python, C, R Algorithms, Data Structures, Information theory Programming projects
Generalists	Data Science tools and languages Database modeling, SQL
Skills	
Programming	Fluent: C++, Bash, Python, L ^A T _E X Working Knowledge: C, Java, R, VB, VBA
Technical	Evolutionary Algorithms, Machine Learning, Multi-Agents Systems, High-Performance Computing
Languages	French (Mother tongue), English (Fluent - 980/990 at the TOEIC)

Research

Synopsis My main interests revolve around autonomous artificial life forms: from the design of efficient morphologies to the emergence of high-level control schemes and the evolutionary constraints that favor both. Recently I am mostly focused on Artificial Neural Networks (ANN) through NeuroEvolution and Reinforcement Learning, notably in the context of Interactive Evolutionary Robotics.

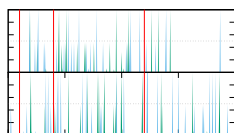
Artificial Neural Networks Studying the emergence of various “cognitive” capabilities in virtual robots, controlled by a spontaneously differentiated neural network, in response to biologically plausible stimuli.



[3, 1, 2] VIRTUAL FMRI

Extracting stimulus-specific regions of an ANN by applying a virtual equivalent to functional Magnetic Resonance Imaging (fMRI) and building high-level cognitive maps.

Software: ES-HyperNEAT (Custom implementation)

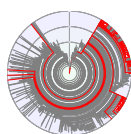


[9, 8] COMMUNICATION

Exploring the mechanisms leading to emergent communication, how it becomes structured and its neural implementation.

Species Dynamics

Promoting complex evolutionary trajectories and extracting species-level information from individual reproductions.



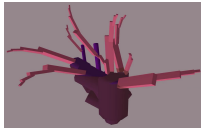
[12, 10] PHYLOGENETICS

Automatically transforming genealogic trees into phylogenetic abstraction to access the emergent species-level dynamics.

Software: APOGeT(Automated Phylogeny Over Geological Timescales)



Morphogenetic Engineering



Expertise

Evolutionary Algorithms

[6] SPECIATION

Application of a bio-inspired reproduction operator (Bail-Out Crossover) capable of spontaneously generating species barriers thereby allowing for emergent speciation.

[4, 16] EVOLUTIONARY ALGORITHMS

Introduced a novel paradigm, EDEnS (Environment-Driven Evolutionary Selection), relying on the indirect controlling of whole populations' evolutionary trajectories through an evolvable environmental controller.

Developing functional morphology in response to environmental constraints and evolutionary pressures.

[11, 4, 5, 12] DEVELOPMENTAL MORPHOLOGIES

Production of mature, functional virtual plants from a single cell/structure using various genetic encodings (rules-based, L-Systems, Graphtals) in response to environmental constraints.

[1] VIRTUAL ROBOTS

Use of genetically parameterized cubic bézier curves to control both static and mobile structures on the perimeter of virtual circular robots.

Software: Splinoids

Videos: on Vimeo

Machine Learning

- Environment-Driven Evolutionary Selection (EDEnS)
- Multi-objective Optimisation
- High Performance Computing (HPC), Co-evolution, Novelty
- Artificial Neural Networks (ANN, CNN, RNN)
- Composite Pattern-Producing Networks (CPPN)
- Cartesian Genetic Programming (CGP)
- Genetic Regulatory Networks (GRN)
- Hidden Markov Models (HMM)
- Stable baselines 3

Teachings

Postdoc 2023-2024

Vrije Universiteit Amsterdam

- NeuroEvolution (lecture)
- Learning Machines (projects) 45h
- Master and Bachelor thesis supervision

Course management 2021-2022

Toulouse I University & Toulouse III University, France

- Computer Science projects 72h
- *Multi-Agent Systems, Complex Systems, Simulation*
- R programming 67.5h
- *English lectures*
- Information theory 22.5h
- Servers and contents 18.75h

Teaching fellow 2017-2021	Toulouse I University & Toulouse III University, France	
	• Statistical software (R & Python)	36h
	• Algorithms	60h
	• Excel & VBA	60h
	• Modeling in databases	21h
Practical work supervisor 2016-2021	Toulouse III University, France	
	• Software projects	69.2h
	• Data structures	18.8h
	• C Programming	36h
	• Python	8h

Outreach

Reviewer 2023	<ul style="list-style-type: none"> • Symposium on Artificial Life program comitee member • Journal of Open Source Software reviewer 	
EduMix Aspi-Friendly 2021	Initiated a project for the self-monitoring of well-being in students with autistic disorders alongside a heterogeneous team of neuro-(a)typical and various profiles (faculty, designers, developers ...).	

Internships

Morphogenetic Engineering 2016 (6 months)	<p>Toulouse Research Institute on Computer Science (IRIT), France <i>“Rule-based artificial embryogenesis in a complex 3D environment”</i> Deployed rule-based genomes on the MecaCell platform to study artificial plant growth and cell specialization. Contact: Pr. Y. Duthen (yves.duthen@irit.fr)</p>	
Machine Learning 2015 (3 months)	<p>IRIT, <i>“Comparison of different evolutionary approaches, an application to the GECCO 2015 challenge”</i> Performed a performance comparison (accuracy, efficiency) between Artificial Neural and Genetic Regulatory Networks on the 2015 GECCO temperature prediction challenge data. Contact: Pr. H. Luga (herve.luga@irit.fr)</p>	
Machine Learning 2014 (2 months)	<p>IRIT, <i>“An architecture for automated bird discrimination”</i> Applied Hidden Markov Models to the BirdClef2014 challenge on the identification of specific bird species in a corpus of thousands of recordings. Contact: Pr. J. Farinas (jerome.farinas@irit.fr)</p>	

Education

PhD 2016 - 2020	Toulouse I University, France Defended the 15th of July 2020 Thesis title: “ <i>Environment-driven speciation: long term interactions in artificial plant communities</i> ” Investigated how complexification of artificial creatures could be further enhanced through the indirect control provided by a co-evolved, highly dynamical environment. Rapporteurs: Pr. P. Collet & DoR. F. Vico Contact: Pr. Y. Duthen (yves.duthen@irit.fr)
Master 2014 - 2016	Toulouse III University, France (<i>with honours</i>) Artificial Intelligence: mathematical & symbolic models, training methods
Bachelor 2011 - 2014	Toulouse III University (<i>with distinction</i>) Computer Science: networks, programming, systems, mathematics

Scholarships and Fellowships

2023-2026 ~ 200K €	Postdoctoral funding from the Hybrid Intelligence consortium (Netherlands)
2016-2019 70K €	PhD Fellowship from the French Minister of Higher Education and Research (MESR)
2015 10K €	Master Scholarship from the International Mathematics and Computer Science Center (LabEx CIMI, Toulouse)
2014-2015 3K6 €	Merit Scholarship from the Regional Student Welfare Office (CROUS, Toulouse)

Research Output

Journals (peer-reviewed)

- [1] K. Godin-Dubois, S. Cussat-Blanc, and Y. Duthen. “Explaining the Neuroevolution of Fighting Creatures Through Virtual fMRI”. In: *Artificial Life* 29.1 (2023), pp. 66–93. ISSN: 1064-5462. DOI: [10.1162/artl_a_00389](https://doi.org/10.1162/artl_a_00389).

International conferences (peer-reviewed)

- [2] K. Godin-Dubois, S. Cussat-Blanc, and Y. Duthen. “Specialization or Generalization: Investigating NeuroEvolutionary Choices via Virtual fMRI”. In: *ALIFE 2024: Proceedings of the 2024 Artificial Life Conference*. MIT Press, July 2024. DOI: [10.1162/isal_a_00817](https://doi.org/10.1162/isal_a_00817).

- [3] K. Godin-Dubois, S. Cussat-Blanc, and Y. Duthen. “Spontaneous Modular NeuroEvolution Arising from a Life/Dinner Paradox”. In: *The 2021 Conference on Artificial Life*. Cambridge, MA: MIT Press, 2021, p. 95. DOI: 10.1162/isal_a_00431. Presentation: <https://vimeo.com/godinduboisalife/alife2021main>.
- [4] K. Godin-Dubois, S. Cussat-Blanc, and Y. Duthen. “Beneficial Catastrophes: Leveraging Abiotic Constraints through Environment-Driven Evolutionary Selection”. In: *2020 IEEE Symposium Series on Computational Intelligence (SSCI)*. 2020, pp. 94–101. DOI: 10.1109/SSCI47803.2020.9308411.
- [5] K. Godin-Dubois, S. Cussat-Blanc, and Y. Duthen. “Self-Sustainability Challenges of Plants Colonization Strategies in Virtual 3D Environments”. In: *Applications of Evolutionary Computation*. Ed. by P. Kaufmann and P. A. Castillo. Cham: Springer International Publishing, 2019, pp. 377–392. ISBN: 978-3-030-16692-2. DOI: 10.1007/978-3-030-16692-2_25.
- [6] K. Godin-Dubois, S. Cussat-Blanc, and Y. Duthen. “Speciation under Changing Environments”. In: *ALIFE 19*. Vol. 31. Cambridge, MA: MIT Press, 2019, pp. 349–356. ISBN: 978-0-262-35844-6. DOI: 10.1162/isal_a_00186. Presentation: <https://vimeo.com/godinduboisalife/alife2019>.

Workshops

- [7] K. Godin-Dubois et al. “Interactive Embodied Evolution for Socially Adept Artificial General Creatures”. In: *Evolution of Things Workshop at the ALife 2024 Conference*. arXiv, July 2024. DOI: 10.48550/arXiv.2407.21357.
- [8] K. Godin-Dubois, S. Cussat-Blanc, and Y. Duthen. “Emergent Communication for Coordination in Teams of Embodied Agents”. In: *4th International Workshop on Agent-Based Modelling of Human Behaviour (ALife2022)*. 2022.
- [9] K. Godin-Dubois, S. Cussat-Blanc, and Y. Duthen. “On the Benefits of Emergent Communication for Threat Appraisal”. In: *3rd International Workshop on Agent-Based Modelling of Human Behaviour*. Online, 2021. Presentation: <https://vimeo.com/godinduboisalife/abmhub2021>.
- [10] K. Godin-Dubois, S. Cussat-Blanc, and Y. Duthen. “APOGeT: Automated Phylogeny Over Geological Timescales”. In: *MethAL Workshop at ALife 2019*. 2019. DOI: 10.48550/arXiv.2407.21412.
- [11] K. Dubois, S. Cussat-Blanc, and Y. Duthen. “Towards an Artificial Polytrophic Ecosystem”. In: *Morphogenetic Engineering Workshop, at the European Conference on Artificial Life (ECAL) 2017 September 4*. 2017.

Posters

- [12] K. Godin-Dubois, S. Cussat-Blanc, and Y. Duthen. “Studying Long Term Interactions between Plants and Their Environment”. In: *Alife 2018*. Tokyo, 2018. DOI: 10.13140/RG.2.2.27553.97125.

Oral presentations

- [13] K. Godin-Dubois, S. Cussat-Blanc, and Y. Duthen. *Splinoids: First Steps out of EDenS*. Talk. Montreal (Virtual), 2020.

Softwares and datasets

- [14] K. Godin-Dubois. *AMaze: Fully Discrete Training with Three Regimes (Direct, Scaffolding, Interactive) and Two Algorithms (A2C, PPO)*. Dataset. Feb. 2024. DOI: 10.5281/ZENODO.10622913. (Visited on 09/19/2024).
- [15] K. Godin-Dubois, K. Miras, and A. V. Kononova. *AMaze: A Lightweight Benchmark Generator for Sighted Agents*. Zenodo. Software. Apr. 2024. DOI: 10.5281/ZENODO.10907939.

Thesis

- [16] K. Godin-Dubois. “Environment-Driven Speciation: Long-Term Interactions in Artificial Plant Communities”. PhD thesis. Doctoral school of Mathematics, Computer Science and Telecommunications (Toulouse, France), 2020. URL: <http://www.theses.fr/2020TOU10026/document>.