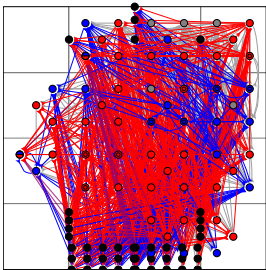
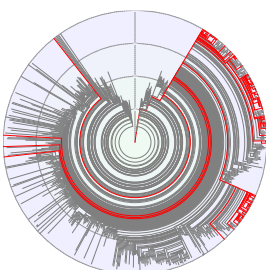
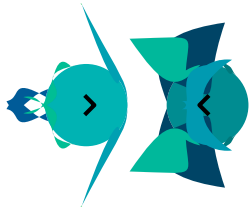


# Dr. Kevin Godin-Dubois

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

## Highlights

**Research** *Artificial Life: Cognition, Interaction & Language*

Main fields			
	Artificial Neural Networks	Species Dynamics	Morphogenetic Engineering

**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

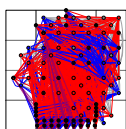
Postdoctoral 2022 - Present	Computer Science / Evolutionary Robotics <i>“NeuroEvolution and Reinforcement Learning for Embodied Robots”</i> Computational Intelligence Group - Vrije Universiteit Amsterdam, The Netherlands Supervisor: Dr. K. Miras (k.dasilvamisdearaujo@vu.nl) Collaborators: Dr. A. Kononova (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)

<b>Teaching</b>	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
<b>Skills</b>	
Programming	Fluent: C++, Bash, Python, L <sup>A</sup> T <sub>E</sub> 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.

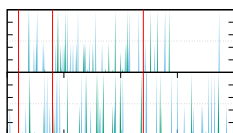
**Artificial Neural Networks** Studying the emergence of various “cognitive” capabilities in virtual robots, controlled by a spontaneously differentiated neural network, in response to biologically plausible stimuli.



[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)

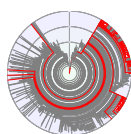


[9, 8] COMMUNICATION

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.



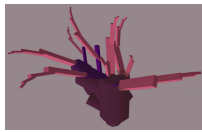
[12, 10] PHYLOGENETICS

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

Machine Learning

### [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

## Teachings

**Postdoc**  
2023-2024

Vrije Universiteit Amsterdam

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

45h

**Course management**  
2021-2022

Toulouse I University & Toulouse III University, France

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

72h

67.5h

22.5h

18.75h

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

## Outreach

<b>Reviewer</b> 2023	<ul style="list-style-type: none"> <li>• Symposium on Artificial Life program comitee member</li> <li>• Journal of Open Source Software reviewer</li> </ul>	
<b>EduMix</b> <b>Aspi-Friendly</b> 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

<b>Morphogenetic Engineering</b> 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.  <b>Contact:</b> Pr. Y. Duthen (<a href="mailto:yves.duthen@irit.fr">yves.duthen@irit.fr</a>)</p>	
<b>Machine Learning</b> 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.  <b>Contact:</b> Pr. H. Luga (<a href="mailto:herve.luga@irit.fr">herve.luga@irit.fr</a>)</p>	
<b>Machine Learning</b> 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.  <b>Contact:</b> Pr. J. Farinas (<a href="mailto:jerome.farinas@irit.fr">jerome.farinas@irit.fr</a>)</p>	

## Education

<b>PhD</b> 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. <b>Rapporteurs:</b> Pr. P. Collet & DoR. F. Vico <b>Contact:</b> Pr. Y. Duthen ( <a href="mailto:yves.duthen@irit.fr">yves.duthen@irit.fr</a> )
<b>Master</b> 2014 - 2016	Toulouse III University, France ( <i>with honours</i> ) Artificial Intelligence: mathematical & symbolic models, training methods
<b>Bachelor</b> 2011 - 2014	Toulouse III University ( <i>with distinction</i> ) Computer Science: networks, programming, systems, mathematics

## Scholarships and Fellowships

<b>2023-2026</b> ~ 200K €	Postdoctoral funding from the Hybrid Intelligence consortium (Netherlands)
<b>2016-2019</b> 70K €	PhD Fellowship from the French Minister of Higher Education and Research (MESR)
<b>2015</b> 10K €	Master Scholarship from the International Mathematics and Computer Science Center (LabEx CIMI, Toulouse)
<b>2014-2015</b> 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>.