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RESEARCH STATEMENT	<p>There are two main thrusts in my research group: evolutionary robotics and machine science. In our evolutionary robotics work, our long-term goal is to enable increasingly large numbers of non-experts to direct the evolution of increasingly complex, capable, and autonomous machines to perform a widening array of difficult tasks. This involves work in theoretical biology: what mechanisms from biological evolution must be incorporated into an evolutionary robotics system to increase its evolvability? It involves work in embodied cognition: how does one spread ‘computation’ out across not only the neural controller of the machine, but also its morphology? It involves work in computational neuroscience: what kinds of neural models should be instantiated in our evolving robots? Finally, our work has psychological and philosophical implications: if a robot evolves that exhibits the behavioral manifestations of high-level cognitive competencies such as self-awareness, how can we determine whether a robot actually possesses, rather than just simulates, that competency? In our work on machine science, we attempt to automate as best we can all aspects of the scientific process: hypothesis generation, selection of phenomenon to measure, experimental design, and data collection. (Machine learning, in contrast, only focuses on hypothesis generation.) My overall strategy is to select generally high-risk, high-reward research questions that, if validated, are likely to change our thinking about seemingly obvious approaches, such as focusing only on control, rather than both morphology and control, in robotics.</p>	
APPOINTMENTS	<p><b>Professor</b>, Department of Computer Science</p> <p>Cyril G. Veinott Green and Gold Professor, Department of Computer Science, College of Engineering &amp; Mathematical Sciences, University of Vermont</p> <p>Director, Vermont Advanced Computing Core</p> <p>Consultant, <a href="#">Xemo Corporation</a> (spinoff company from our laboratory)</p> <p><b>Associate Professor</b>, Department of Computer Science College of Engineering &amp; Mathematical Sciences, University of Vermont</p> <p><i>Secondary appointment in the School of Engineering, UVM</i></p> <p><i>Secondary appointment in the Neuroscience Graduate Program, UVM</i></p> <p>Vice chair, <a href="#">Vermont Complex Systems Center</a></p> <p><b>Assistant Professor</b>, Department of Computer Science College of Engineering &amp; Mathematical Sciences, University of Vermont</p> <p>Director, <a href="#">Morphology, Evolution &amp; Cognition Laboratory</a></p> <p><b>Postdoctoral Associate</b>, Cornell University</p>	<p>2015–2017</p> <p>2015–</p> <p>2015–</p> <p>2014–</p> <p>2012–2015</p> <p>2014–</p> <p>2013–</p> <p>2011–2015</p> <p>2006–2012</p> <p>2006–</p> <p>2003–2006</p>

Advisor: Hod Lipson, Director of the Creative Machines Laboratory

Software Engineer, Computing Devices Canada 1998

EDUCATION **Ph.D.**, Department of Informatics, University of Zurich, Switzerland 1999-2003

Dissertation: *Incremental Approaches to the Combined Evolution of a Robot's Body and Brain.*

Advisor: Rolf Pfeifer, Director of the Zurich Artificial Intelligence Laboratory

**M.S.**, Evolutionary & Adaptive Systems, University of Sussex, UK 1998-1999

Dissertation: *Evolving Heterogeneity: Implications for Agent-Based Systems and Collective Problem Solving.*

Advisor: Inman Harvey

**B.Sc.**, Honors Computer Science, McMaster University, Canada 1993-1997

Graduated *Summa Cum Laude*

Study abroad program, Corpus Christi College, Oxford University, UK 1994

#### BOOKS

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Crowdsourcing novel childhood predictors of adult obesity.  
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  15. Auerbach, J. E. & Bongard, J. C. (2014)  
Environmental influence on the evolution of morphological complexity in machines.  
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Crowdsourcing predictors of behavioral outcomes.  
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2. Bongard, J. and H. Lipson (2005)  
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3. Bongard, J. C. (2011)  
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[Evolving soft robots in tight spaces.](#)  
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[Evolving robot morphology facilitates the evolution of neural modularity and evolvability.](#)  
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#### MINIMALLY-REVIEWED PUBLICATIONS

19. JC Bongard (2016)  
[Evolving soft robots](#). *Soft Robotics* 3(2): 43-44. Editorial.
18. A Larson, A Bernatskiy, C Cappelle, K Livingston, N Livingston,  
J Long, J Schwarz, M Smith & JC Bongard (2016)  
[Recombination hotspots promote the evolvability of modular systems](#).  
*Procs of the Genetic and Evolutionary Computation Conference (GECCO 2016)*. Poster.
17. Bongard, J. C. (2016)  
[I, For One](#).  
*Invited Response to the 2016 Edge Question:*  
[“What do you consider the most interesting \[scientific\] news?”](#)
16. Bongard, J. C. (2015)  
[Manipulators and Manipulanda](#).  
*Invited Response to the 2015 Edge Question:*  
[“What do you think about machines that think?”](#)
15. JP Bagrow, S Desu, MR Frank, N Manukyan, L Mitchell, A Reagan, EE Bloedorn, LB Booker,  
LK Branting, MJ Smith, BF Tivnan, CM Danforth, PS Dodds, JC Bongard (2013).  
Shadow networks: Discovering hidden nodes with models of information flow.  
*arXiv preprint arXiv: 1312.6122*
14. Hornby, G. S. & Bongard, J. C. (2013).  
Accelerating Interactive Evolutionary Algorithms through User Modeling.  
*International Conference on Intelligent User Interfaces*.
13. Celis, S., Bongard, J. C. (2012)  
Not All Physics Simulators Can Be Wrong in the Same Way.  
*Genetic and Evolutionary Computation Conference*, pp. 659-660.

12. Beliveau, P., Hornby, G. S., Bongard, J. C. (2012)  
Interactive Simulated Robot Construction and Controller Evolution.  
*Genetic and Evolutionary Computation Conference*, pp. 627- 628.
11. Bongard, J. C., Beliveau, P., Hornby, G. S. (2012)  
Avoiding Local Optima with Interactive Evolutionary Robotics.  
*Genetic and Evolutionary Computation Conference*, pp. 1405—1406.
10. Bongard, J. C. (2011)  
How evolution shapes the way roboticists think.  
*Procs of the 2nd European Future Technologies Conf and Exhibition (FET 11)*, 7: 8-10.
9. Bongard, J. (2011).  
Morphogenetic robotics recapitulates artificial ontogeny.  
*Newsletter of the Autonomous Mental Development Technical Committee*. 8(2): 3-4.
8. Bongard, J. (2009).  
Biologically inspired computing.  
*IEEE Computer*, 42(4): 95—98.
7. Lu, Z., Bongard, J. C. (2009)  
Exploiting Multiple Classifier Types with Active Learning.  
*Genetic and Evolutionary Computation Conference (GECCO 2009)*, Montreal Canada.
6. Bongard, J. C. (2009)  
The Impact of Jointly Evolving Robot Morphology and Control on Adaptation Rate.  
*Genetic and Evolutionary Computation Conference (GECCO 2009)*, Montreal Canada.
5. Bongard, J. (2008).  
*Probabilistic Robotics* Book Review.  
*Artificial Life*, 14(2): 227—229.
4. Bongard, J. (2008)  
Embodied cognition: the other morphology.  
*The Neuromorphic Engineer*, DOI: 10.2417/1200812.1420.
3. Lungarella, M., Iida, F., Bongard, J. and Pfeifer, R. (2008)  
AI in the 21st century – with historical reflections,  
*Proceedings of the 50th Anniversary Summit of Artificial Intelligence*, pp. 1-8.
2. Lu, Z., Rughani, A. I., Tranmer, B. I., Bongard, J. (2008)  
Informative Sampling for Large Unbalanced Data Sets,  
*Fourth Workshop on Medical Applications of Genetic and Evolutionary Computation at GECCO 2008*.
1. Conduit, R., Adami, C., Lipson, H., Zykov, V. and Bongard, J. (2007).  
To sleep, perchance to dream.  
*Science*, 315: 1219-1220.

FUNDING

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Total to date: **\$3,606,000.**

Total as PI: \$2,556,000.

Total Funding as Co-PI: \$1,050,000.

CURRENT	<p>National Science Foundation <b>EAGER</b> award, \$100,000  <i>Scalable crowdsourced reinforcement of robot behavior.</i>  A one-year project aimed at recruiting and retaining large numbers of non-experts to collaboratively teach robots the components of human languages.</p> <p>Army Research Office, \$400,000  <i>Morphological Plasticity for the Design, Control, and Deployment of Complex Engineering Systems.</i>  A three-year project during which it will be shown that thermodynamically-open soft robots are more amenable to co-optimization of body plan and neural controller than more traditional robot systems.</p> <p>NASA <b>ROSES</b> award (co-PI; PI: Kamalika Das), \$300,000  <i>Uncovering effects of climate variables on global vegetation.</i>  This is a collaboration with environmental scientists to discover previously unknown predictors of vegetation change in the Amazon basin. We have enriching the standard Genetic Programming method to do so.</p> <p>NSF <b>BIGDATA</b> award (co-PI; PI: James Bagrow, UVM), \$600,000  <i>Hunch &amp; Crunch: Iterative Crowdsourced Hypothesis Generation.</i>  This project aims at determining how well ‘the crowd’ can collectively propose and validate causal links between computer-discovered correlations in social network corpora.</p> <p>NSF <b>INSPIRE</b> award (co-PI; PI: Ken Livinston, Vassar College), \$500,000  <i>Evolvability and the emergence of modularity.</i>  This is a collaboration between computer scientists, biologists, and cognitive scientists to uncover how the body plan of robots and organisms influences the evolution of modularity and evolvability.</p> <p>NSF <b>CAREER/PECASE</b> award, \$499,999  <i>Ultimate Mechanisms of Embodied Cognition.</i>  The goal in this project is to demonstrate that more complex and capable robots can be automatically generated if their body plans, as well as their neural controllers, are placed under evolutionary control.</p>	<p>2016-2017</p> <p>2016-2018</p> <p>2015-2017</p> <p>2014-2017</p> <p>2013-2017</p> <p>2010-2016</p>
PREVIOUS FUNDING	<p>DARPA <b>MSEE</b> award, \$614,830  <i>Continually Plastic Modeling of Non-Stationary Systems.</i>  This award involved adapting symbolic regression to find hitherto unknown relationships between human brain regions to predict future human behavior, such as substance abuse.</p> <p>DARPA <b>M3</b> award (co-PI; PI: Greg Hornby, NASA Ames), \$200,000  <i>Rapid Human-Computer Interactive Conceptual Design of Mobile and Manipulative Robot Systems.</i>  This was our group’s first attempt to crowdsource robotics. During this award we investigated ways in which computers could create models of human behavior from data generated by humans directing the evolution of robots. The resulting human models could then continue to guide robot evolution when the human participants tired.</p> <p>Microsoft Research <b>New Faculty Fellowship</b>, \$200,000</p>	<p>2011-2015</p> <p>2011-2014</p> <p>2007—</p>

This was an open-ended research gift which allowed us to explore issues in social robots as well as evolutionary robotics.

NSF **SGER** award, \$192,391

2007–2009

*Exploiting ‘Like Me’ Hypotheses for Learning Robots*

This was a collaborative project with developmental psychologist Andrew Meltzoff at the University of Washington to determine how robots could learn which teachers they were likely to be able to learn from.

SERVICE

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EDITORSHIPS	Associate Editor, <i>Frontiers in Robotics and AI</i>	2014–
	Review Editorial Board, <i>Evolutionary Robotics</i>	2014–
	Associate Editor, <i>Soft Robotics</i>	2013–
	Action Editor, <i>Neural Computation</i>	2011–
	Academic Editor, <i>Public Library of Science (PLoS) ONE</i>	2011–
	Guest Associate Editor, <i>PLoS Computational Biology</i>	2013–
TREASURER	International Society for Artificial Life	2014–
MEMBERSHIP	University of Vermont STEM Leadership Council	2014–
	<i>13th Intl Conf on the Simulation of Adaptive Behavior</i> , program committee	2014
	<i>13th Intl Conf on Parallel Problem Solving from Nature</i> , program committee	2014
	<i>Genetic and Evolutionary Computation Conference</i> , program committee	annually
	<i>Living Machines Conference</i> , program committee	annually
	<i>Artificial Life Conference</i> , program committee	biennially
	<i>European Conference on Artificial Life Conference</i> , program committee	biennially
	<i>Living Machines Conference</i> , program committee	annually
	<i>Genetic and Evolutionary Computation Conference</i> , track chair	2013
	<i>Congress on Evolutionary Computation (CEC)</i> , program committee	2013
	National affiliate, University of Iowa <i>DeLTa</i> center	2013–
<i>Federation of American Scientists (FAS)</i> board of sponsors	2011–	
<i>Institute of Electrical and Electronics Engineers (IEEE)</i>	2007–	
<i>Association for Computing Machinery (ACM)</i>	2006–	
REVIEWER	<i>Science</i>	
	<i>Nature</i>	
	<i>Proceedings of the National Academy of Science (PNAS)</i>	
	<i>Nature Communications</i>	
	<i>PLoS ONE</i>	
	<i>PLoS Computational Biology</i>	
	<i>Neural Computation</i>	
	<i>Journal of Machine Learning Research (JMLR)</i>	
	<i>IEEE Transactions on Evolutionary Computation</i>	
	<i>IEEE Transactions on Robotics</i>	
	<i>Artificial Life</i>	
<i>Adaptive Behavior</i>		
<i>IEEE Transactions on Systems, Man and Cybernetics</i>		
<i>Journal of Neurorobotics</i>		
PANELIST	The EC Flagship Initiative ‘Human Brain Project’ proposal reviewing	2013
	National Institutes of Health (NIH) proposal reviewing	2010
	National Science Foundation (NSF) proposal reviewing (about once/year)	2006–

INTERNAL	Director of the Vermont Advanced Computing Core (UVM's supercomputer) Vice Chair, Vermont Complex Systems Center UVM STEM Leadership Council Member	2015– 2011–2015 2013–
OUTREACH	~10 presentations to K-12 students per year. Representative sample below.	
	Presentation to ~30 Abenaki Nation high school students	August, 2016
	Governor's Institute of Vermont presentations (~100 students)	2012–2017
	Burlington High School presentation on robotics.	2014–2017
	<a href="#">Waldorf School</a> (grades 7 through 12), Toronto	Feb, 2016
	<a href="#">Steelesview Public School</a> , Toronto (grades 2 and 3)	Feb, 2016
	<a href="#">Governor's Institute of Vermont</a> summer program guest instructor	2007–2013
	Boy Scouts of America guest instructor	Dec, 2013
	<a href="#">Reddit AMA</a> (“Ask Me Anything”)	Aug, 2013
	<a href="#">Hour of Code</a> visitor, Browns River Middle School	2013, 2014
TEACHING	<hr/>	
	<i>Ludobots</i> . (~ 2000 students to date)	2014–
	Ludobots is an online course developed outside the normal MOOC framework: The course is hosted on reddit.com, which enables students to add content to the course. Student-added content that other students find helpful is voted up and incorporated into the course; content that does not prove useful is down voted and removed from the course automatically.	
	<i>Evolutionary Robotics</i> ( <a href="#">video lectures here</a> )	Spring 2016
	36/1 under/graduate students; instructor rating: 4.33/5; difficulty rating: 4.24/5.	
	<i>Human Computer Interaction</i> ( <a href="#">video lectures here</a> )	Fall 2015
	34/2 under/graduate students; instructor rating: 5/5; difficulty rating: 3.45/5	
	<i>Evolutionary Robotics</i>	Spring 2015
	25/2 under/graduate students; instructor rating: missing; difficulty rating: missing.	
	<i>Human Computer Interaction</i>	Fall 2014
	29/1 under/graduate students; instructor rating: 4.57/5; difficulty rating: 3.76/5	
	<i>Evolutionary Robotics</i>	Spring 2014
	23/2 under/graduate students; instructor rating: 4.86/5; difficulty rating: 3.57/5	
	<i>Human Computer Interaction</i>	Fall 2013
	34/1 under/graduate students; instructor rating: 4.61/5; difficulty rating: 3.53/5	
	<i>Evolutionary Robotics</i>	Spring 2013
	23/2 under/graduate students; instructor rating: 4.81/5; difficulty rating: 3.81/5	
	[no class; sabbatical]	Fall 2012
	<i>Human Computer Interaction</i>	Spring 2012
	14/1 under/graduate students; instructor rating: missing; difficulty rating: missing	
	<i>Evolutionary Robotics</i>	Fall 2011
	19/2 under/graduate students; instructor rating: missing; difficulty rating: missing	
	<i>Human Computer Interaction</i>	Spring 2011
	20/2 under/graduate students; instructor rating: missing; difficulty rating: missing	

<i>Evolutionary Robotics</i> (new course preparation) 12/2 under/graduate students; instructor rating: missing; difficulty rating: missing	Fall 2010
<i>Software Engineering</i> 10/0 under/graduate students; instructor rating: missing; difficulty rating: missing	Spring 2010
<i>Human Computer Interaction</i> 16/0 under/graduate students; instructor rating: missing; difficulty rating: missing	Spring 2010
<i>Embodied Cognition Sophomore Seminar</i> (new course preparation) 11/0 under/graduate students; instructor rating: missing; difficulty rating: missing	Fall 2009
<i>Human Computer Interaction</i> 18/0 under/graduate students; instructor rating: missing; difficulty rating: missing	Spring 2009
<i>Software Engineering</i> 16/0 under/graduate students; instructor rating: 4.58/5; difficulty rating: 4.27/5	Fall 2008
<i>Human Computer Interaction</i> 26/2 under/graduate students; instructor rating: 4.69/5; difficulty rating: 3.33/5	Spring 2008
<i>Software Engineering</i> (new course prep) 11/0 under/graduate students; instructor rating: 4.73/5; difficulty rating: 3.64/5	Fall 2007
<i>Human Computer Interaction</i> (new course prep) 14/0 under/graduate students; instructor rating: 4.55/5; difficulty rating: 3.55/5	Spring 2007

ADVISING

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POSTDOCS	<b>Marcin Szubert</b>	2015–
	<b>Ilknur Icke</b>	2012–2013
	<b>Kaipa Krishnanand</b>	2008–2010
PHD'S	<b>Sam Kriegman</b> (Computer Science)	2016–
	<b>Collin Cappelle</b> (Computer Science)	2015–
	<b>Anton Bernatskiy</b> (Computer Science)	2013–
	<b>Roman Popov</b> (Computer Science)	2013–
	<b>Mark Wagy</b> (Computer Science)) Dissertation: <i>Enabling machine science through distributed human computing.</i>	2013–2016
	<b>Joshua Auerbach</b> (Computer Science)) Dissertation: <i>The evolution of complexity in autonomous robots.</i>	2009–2013
	<b>Zhenyu Lu</b> (Computer Science) Dissertation: <i>Active learning with adaptive heterogeneous ensembles.</i>	2006–2011
MASTERS	<b>Nate Powell</b> (Statistics)	2015–2016



STUDENTS	Dissertation: <i>The role of Uncertainty in Categorical Perception Utilizing Statistical Learning in Robots.</i>	
	<a href="#">Sam Kriegman</a> (Co-advising; statistics) Dissertation: <i>Evolving spatially aggregated features from satellite imagery for regional modeling.</i>	2015–2016
	<a href="#">Afsoon Yousefi-Zowj</a> (Computer Science) Dissertation: <i>A Genetic Programming approach to cost-sensitive control in wireless sensor networks.</i>	2014–2015
	Karol Zieba (Computer Science) Dissertation: <i>Evolving multi-modal sensors.</i>	2014–2015
	<a href="#">David Buckingham</a> (Computer Science) Dissertation: <i>Inductive learning of snowpack distribution models for improved estimation of areal snow water equivalent.</i>	2012–2014
	<a href="#">Christopher Pierce</a> (Computer Science; project option.)	2012–2014
	<a href="#">Somdeb Chatterjee</a> (Computer Science) Dissertation: <i>Crowdsourcing predictors for modeling behavioral outcomes.</i>	2010–2012
	<a href="#">Yunfei Zhao</a> (Computer Science; project option.)	2010–2012
	<a href="#">Peter Hurd</a> (Computer Science; project option.)	2008–2010
UNDERGRAD THESES	Ari Larson (Computer Science)	2015–2016
	Mariko Totten (Computer Science)	2014–2015
	Timothy Rizvanov (Computer Science)	2013–2014
	Fritz Davenport (Computer Science)	2013–2014
	Alex Berger (Business administration)	2013–2014
PHD DEFENSE COMMITTEE MEMBER	Thomas McAndrew, UVM	2016
	Emily Cody, UVM	2016
	Morgan Frank, UVM	2014
	Nicholas Chaumont, Keck Graduate Institute, USA	2014
	Ahmed Hamed, UVM	2014
	Jesse van den Kieboom, EPFL, Switzerland	2014
	Eitan Pechenik, UVM	2013
	Song Wang, UVM	2013
	Karim Chichakly, UVM	2013
	Nicolas Allgaier, UVM	2013
	Thierry Buecheler, University of Zurich, Switzerland	2012
	Sylvain Koos, UPMC, France	2011
	Peter Duerr, EPFL, Switzerland	2010
OTHER	Jake Williams (MSc qualifying exam committee member)	2013
INVITED TALKS		
June, 2017	Human Brain Project workshop on embodied cognition (Geneva, CH)	Invited
Feb, 2017	Santa Fe Institute Workshop on “Evolution and Restraint of Malicious Behavior in Complex Systems”	Invited
Oct, 2016	Presentation on “Speaking to a general audience” for the UVM IGERT Smart Grid graduate students	Invited

Sept, 2016	ASME Smart Materials, Adaptive Structures and Intelligent Systems Conference (Stowe, VT)	Invited
Sept, 2016	Santa Fe Institute Short Course on Innovation (Austin, TX)	Invited
Sept, 2016	<a href="#">Parallel Problem Solving from Nature</a> conference. (University of Stirling, Edinburgh)	<b>Keynote</b>
May, 2016	<a href="#">Trusted autonomous systems</a> . (ACFR, University of Sydney, Australia)	Invited
May, 2016	Trusted autonomous systems. (Intl. Symp. on Trusted Autonomous Systems, Australia)	<b>Keynote</b>
Mar, 2016	<a href="#">Some philosophical implications of evolutionary robotics</a> . (UPitt <a href="#">HPS</a> Annual Lecture Series)	Invited
Feb, 2016	Evo devo robo. ( <a href="#">University of Toronto Cognitive Science Symposium</a> )	Invited
Dec, 2015	<a href="#">ShanghAI</a> lecture (simulcast to classrooms in Europe and Asia)	Invited
Dec, 2015	New Jersey Institute of Technology (host: Gal Haspel, biology)	Invited
Nov, 2015	UVM Honors College Plenary Lecture	Invited
May, 2015	<a href="#">Factory of Imagination</a> lecture, Denmark (500 attendees)	<b>Keynote</b>
Feb, 2015	<a href="#">ShanghAI</a> lecture (simulcast to classrooms in Europe and Asia)	Invited
Nov, 2014	Cornell Univeristy (host: Robert Shepherd, engineering)	Invited
Sept, 2014	University of Maryland workshop on soft robotics	Invited
Aug, 2014	<a href="#">Scifoo</a> (hosts: Nature, Google, O'Reilly Media, Digital Science)	Invited
July, 2014	Workshop on Artificial Life and the Web at ALife conference	Invited
July, 2014	International Society for Artificial Life (ISAL) Summer School	Invited
June, 2014	DARPA Biological Technologies Office	Invited
June, 2014	Neural Systems & Behavior Summer School, Woods Hole Marine Biology Lab	Invited
May, 2014	EPFL, Lausanne, Switzerland (host: Auke Ipeert)	Invited
Mar, 2014	National STEM Conference (Concept Schools), Cleveland, OH	<b>Keynote</b>
Mar, 2014	Air Force Research Laboratories (AFRL), Rome, NY	Invited
Dec, 2013	<a href="#">ShanghAI</a> lecture (simulcast to 15 classrooms in Europe and Asia)	Invited
Nov, 2013	National Autonomous University of Mexico (host: Carlos Gershenson)	Invited
Oct, 2013	University of Iowa <a href="#">Delta Center</a> (host: Mark Blumberg, psychology)	Invited
Sept, 2013	eSMC neuroscience/robotics graduate summer school (host: Andreas Engel)	Invited
Sept, 2013	Evolutionary Biology lecture, University of Zurich (host: Andreas Wagner)	Invited
Aug, 2013	Gordon Research Conference on Neuroethology (host: Heather Eisten, biology)	Invited
July, 2013	Soft Robotics Workshop at ETH, Zurich (host: Fumiya Iida, robotics)	<b>Keynote</b>
June, 2013	Evolution Meeting, SSE Presidential Symposium (host: Richard Lenski, biology)	Invited
June, 2013	Evolution Meeting, Education Symposium (host: George Gilchrist, NSF)	Invited
Mar, 2013	University of Texas at Austin (host: Dana Ballard, Computer Science)	Invited
Nov, 2012	Vassar College (host: John Long, biology)	Invited
Nov, 2012	Harvard University (host: Radhika Nagpal, engineering)	Invited
June, 2012	Tufts University (host: Michael Levin, biology)	Invited
Apr, 2012	Tufts University (host: Barry Trimmer, biology)	Invited
Jan, 2012	University of Southern California (host: Francisco Valero-Cuevas, bioengineering)	Invited
Dec, 2011	Castleton State College, Vermont	Invited
Nov, 2011	Global ShanghAI Lecture series (telecast from Vermont)	Invited
Oct, 2011	TEDx presentation, University of Vermont	Invited
July, 2011	Woods Hole Workshop on Computational Neuroscience (host: Terrence Sejnowski)	Invited
May, 2011	European Future and Emerging Technologies (FET) Conference, Budapest, HU	<b>Keynote</b>
Mar, 2011	Annual lecture, Simon Fraser University, Canada (host: Bernard Roitbert)	Invited
Jan, 2011	Cognitive Dynamical Systems Workshop, Salk Institute (host: T. Sejnowski)	Invited
Nov, 2010	Defense Sciences Research Council (DSRC), Washington, DC	<b>Keynote</b>
Oct, 2010	Michigan State University (host: Charles Ofria, computer science)	Invited
Sept, 2010	Perception & Action Workshop, Sante Fe Institute	Invited
Sept, 2010	Evolutionary Studies Seminar Series, Binghamton University	Invited

Sept, 2010	Intl Workshop on Guided Self-Organization, Indiana University	Invited
Sept, 2010	Rensselaer Polytechnic Institute (host: Brent Fajel, cognitive science)	Invited
Jan, 2010	Advancement of Artificial Cognitive Systems, ETH, Zurich	<b>Keynote</b>
Oct, 2009	University of Massachusetts, Amherst	Invited
Oct, 2009	Evolutionary Robotics Workshop at the IEEE IROS Conference	Invited
Sept, 2009	Union College, Schenectady, NY (host: John Rieffel, computer science)	Invited
May, 2009	McMaster Origins Institute, Canada	Invited
Mar, 2009	University of California San Diego (annual lecture; host: T. Sejnowski)	<b>Keynote</b>
Mar, 2009	Salk Institute (host: T. Sejnowski)	Invited
Feb, 2009	Hughes Research Laboratories, Malibu, CA	Invited
Feb, 2009	Pragyan technical festival, India (telecast from Vermont)	Invited
Oct, 2008	Dartmouth College (host: Tanzeem Choudhury)	Invited
Oct, 2008	McMaster University, Canada (host: Simon Haykin)	Invited
Sept, 2008	NAE's Frontiers of Engineering Symposium, New Mexico	Invited
June, 2008	Telluride Neuromorphic Engineering Workshop	Invited
June, 2008	Woods Hole Workshop on Computational Neuroscience	Invited
May, 2008	Genetic Programming Theory and Practice, University of Michigan	<b>Keynote</b>
Apr, 2008	Cognitive Engineering Workshop, Sardinia, IT	Invited
Jan, 2008	Boston University (host: Steven Grossberg)	Invited
Oct, 2007	Elder Education Enrichment program, Vermont	Invited
Oct, 2007	IBM T. J. Watson Research Center (host: Kerry Bernstein)	Invited
Aug, 2007	National Science Foundation <i>Science of Learning Workshop</i>	Invited
2004	AI Lab, University of Zurich, Switzerland	Invited
2003	EPSRC Workshop on Evolvability, Hertfordshire, UK	Invited
2002	Biozentrum, University of Basel, Switzerland	Invited
2002	Massachusetts Institute of Technology (host: Rodney Brooks)	Invited
2002	Woods Hole Marine Biological Laboratory (host: Jelle Atema)	Invited
2002	Cognitive Science Department, University of Sussex, UK	Invited

## MEDIA

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### MISCELLANEOUS COVERAGE

- [PDF] The Accidental Roboticist (Oct, 2014)
- [URL] UVM Researchers Hunt Down Hidden Network Nodes with the Help of Eureka. (Feb, 2014)
- [URL] Will Your Child Be An Overweight Adult? (Feb, 2014)
- [HTML] Reddit AMA ("Ask Me Anything")
- [PDF] Smithsonian Magazine: Beware. Scientists are Creating Machines That Can Evolve on Their Own (Dec, 2013)
- [VID] "Robotics and Humanity" (Apr, 2012)
- [PDF] Science News: "Software Scientist" (Jan, 2012)
- [PDF] Irish Times: "iRobot" (Nov 16, 2011)
- [mp3] Financial Times Podcast (May, 2011)
- [PDF] Science News: "Meet the Growbots" (Jan. 29, 2011)
- [PDF] University of Vermont Honors College (January, 2010)
- [PDF] Discover Magazine (June, 2008)
- [PDF] Burlington Free Press article (May 18, 2007)

#### MEDIA COVERAGE FOR MORPHOLOGICAL COMPLEXITY PAPER (2014)

- [PDF] IO9 Blog post: Bots show how tough environments affect evolution (Jan, 2014)
- [PDF] Motherboard Blog post: To Create Advanced Robots, Let Them Evolve in Complex Environments (Jan, 2014)
- [PDF] Eurekalert: Environment affects an organism's complexity (Jan, 2014)

#### MEDIA COVERAGE FOR PRESIDENTIAL EARLY CAREER AWARD FOR SCIENTISTS AND ENGINEERS (2011)

- [PDF] White House Press Release: President Obama honors outstanding early career scientists (Sept, 2011)
- [PDF] UVM Press Release: President Obama Honors UVM Robotics Scientist (Sept, 2011)
- [PDF] Seven Days Magazine: UVM scientist wins highest national award (Oct, 2011)
- [PDF] Rutland Herald: UVM scientist wins highest national award (Sept, 2011)

#### MEDIA COVERAGE FOR METAMORPHOSING MACHINES (2011)

- [PDF] The Why Files: "Dr. Darwin teaches robot." (Jan. 5, 2012)
- [PDF] American Scientist: "Bringing Up Robots" (February, 2011)
- [VID] Local Vermont television (WCAX) interview (Feb. 11, 2011)
- [PDF] Vermont Cynic: "Evolution fuels robot research" (Feb. 14, 2011)
- [PDF] Discover Blog: "Robots that Evolve Like Animals Are Tough and Smart-Like Animals" (Feb. 14, 2011)
- [PDF] Boston Globe: "Artificial intelligence based on Darwins idea" (Jan. 31, 2011)
- [PDF] Burlington Free Press: "UVM professor explores robot's ability to evolve" (Feb. 7, 2011)
- [PDF] CBS: "Scientists: Robots Learn to Walk in Stages" (Jan. 25, 2011)
- [bmp] On the front page of the National Science Foundation's website (Jan. 31, 2011)
- [mp3] Voice of America, Our World (Jan. 29, 2011)
- [PDF] Wired: "Robots Evolve More Natural Ways of Walking" (Jan. 26, 2011)
- [PDF] Popular Science: "Evolutionary Robots Learn to Crawl Before They Walk" (Jan. 25, 2011)
- [PDF] New Scientist: "Metamorphosis key to creating stable walking robots" (Jan. 10, 2011)
- [PDF] Robaid: "Evolutive morphological change of robots enhances their capabilities" (Jan. 14, 2011)
- [PDF] Kurzweilai.net: "Evolutionary robotics: for robust robots, let them be babies first" (Jan. 21, 2011)

#### MEDIA COVERAGE FOR RESILIENT MACHINES (2006/2007)

- [PDF] New Scientist: "'Self-aware' space rovers would be speedy explorers" (Sept. 21, 2007)
- [PDF] Esquire: "Six ideas that will change the world [Machines That Fix Themselves]" (Nov. 11, 2007)
- [mp3] Vermont Public Radio interview
- [PDF] Part of Slate.com's five biggest neuroscience developments of the year
- [wmv] Discovery Channel TV Interview
- [mp3] EPFL Talking Robots podcast (with Hod Lipson) (Switzerland)
- [wmv] New England Cable News (NECN) TV Interview
- [PDF] USA Today
- [PDF] Forbes
- [PDF] New Scientist (UK)
- [PDF] MIT Technology Review
- [PDF] MSNBC
- [PDF] Nature News
- [PDF] Science News
- [mp3] Science Update podcast
- [PDF] National Geographic
- [PDF] The Guardian (UK)

- [\[wma\]](#) The Guardian podcast (UK)
- [\[PDF\]](#) Scientific American
- [\[PDF\]](#) Slashdot
- [\[PDF\]](#) InformationWeek
- [\[PDF\]](#) University of Vermont Interview
- [\[PDF\]](#) The Globe and Mail (Canada)
- [\[PDF\]](#) The Future of Things (Israel)
- [\[PDF\]](#) Cosmos (Australia)
- [\[PDF\]](#) Russian Newsweek
- [\[PDF\]](#) V Magazine
- [\[PDF\]](#) Die Zeit (Germany) [English translation]
- [\[mp3\]](#) Deutschlandfunk, podcast (Germany; German only)

#### MEDIA COVERAGE FOR ARTIFICIAL ONTOGENY (2002/2003)

- [\[PDF\]](#) Nature builds other robots [Neue Zuercher Zeitungen] (German / English)
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- [\[PDF\]](#) The Fairytale of Intelligent Monsters (2001)

#### COMMENTS ON OTHERS' WORK

- [\[PDF\]](#) New Scientist: Darwin's Robots (Sept, 2011)
- [\[PDF\]](#) Deep Data Dives Discover Natural Laws (2009)