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## APPOINTMENTS

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2020– **Postdoctoral Associate**, University of Vermont

2011–2014 Actuary, Chubb Insurance

## EDUCATION

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2016–2020 **Ph.D.**, Computer Science, University of Vermont, USA  
[Design for an Increasingly Protean Machine](#).  
Advisor: Josh Bongard

2014–2016 **M.S.**, Statistics, University of Vermont, USA

2006–2010 **B.S.**, Applied Mathematics, Ohio University, USA

## PUBLICATIONS

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18. S Kriegman, A-M Nasab, D Blackiston, H Steele, M Levin, R Kramer-Bottiglio, J Bongard. (2021).  
[Scale invariant robot behavior with fractals](#).  
*Preprint*, in review.
17. D Blackiston, E Lederer, S Kriegman, S Garnier, J Bongard, M Levin. (2021).  
[A cellular platform for the development of synthetic living machines](#).  
*Science Robotics*, 6(52): eabf1571.
16. D Shah, J Powers, L Tilton, S Kriegman, J Bongard, R Kramer-Bottiglio. (2021).  
[A soft robot that adapts to environments through shape change](#).  
*Nature Machine Intelligence*, 3, 51-59.
15. D Shah, B Yang, S Kriegman, M Levin, J Bongard, R Kramer-Bottiglio. (2020).  
[Shape Changing Robots: Bioinspiration, Simulation, and Physical Realization](#).  
*Advanced Materials*, 2002882.
14. J Powers, R Grindle, S Kriegman, L Frati, N Cheney, J Bongard. (2020).  
[Morphology dictates learnability in neural controllers](#).  
*Artificial Life Conference Proceedings*, 52-59.
13. S Kriegman, A-M Nasab, D Shah, H Steele, G Branin, M Levin, J Bongard, R Kramer-Bottiglio. (2020).  
[Scalable sim-to-real transfer of soft robot designs](#).  
*IEEE Conference on Soft Robotics (RoboSoft)*, 359-366, 10.1109/RoboSoft48309.2020.9116004.
12. S Kriegman\*, D Blackiston\*, M Levin, J Bongard. (2020).  
[A scalable pipeline for designing reconfigurable organisms](#).  
*Proceedings of the National Academy of Sciences*, 117(4): 1853-1859.  
(A perspective article on this work by P. Ball can be found [here](#).)

11. S Kriegman. (2019).  
[Why virtual creatures matter.](#)  
*Nature Machine Intelligence*, 1(10): 492-492.
10. D Matthews, S Kriegman, C Cappelle, J Bongard. (2019).  
[Word2vec to behavior: morphology facilitates the grounding of language in machines.](#)  
*IEEE/RSJ Conference on Intelligent Robots and Systems (IROS)*
9. S Kriegman, S Walker, D Shah, M Levin, R Kramer-Bottiglio, J Bongard (2019).  
[Automated shapeshifting for function recovery in damaged robots.](#)  
*Robotics: Science and Systems (RSS)*, 10.15607/RSS.2019.XV.028  
(A perspective article on this work by H. Hauser can be found [here](#).)
8. S Kriegman, N Cheney, J Bongard. (2018).  
[How morphological development can guide evolution.](#)  
*Nature Scientific Reports*, 8(1): 13934.
7. S Beaulieu, S Kriegman, J Bongard. (2018).  
[Combating catastrophic forgetting with developmental compression.](#)  
*Genetic and Evolutionary Computation Conference (GECCO)*, 386-393.
6. S Kriegman, N Cheney, F Corucci, J Bongard. (2018).  
[Interoceptive robustness through environment-mediated morphological development.](#)  
*Genetic and Evolutionary Computation Conference (GECCO)*, 109-116, 10.1145/3205455.3205529.
5. J Powers, S Kriegman, J Bongard. (2018).  
[The effects of morphology and fitness on catastrophic interference.](#)  
*Artificial Life Conference Proceedings*, 606-613.
4. S Kriegman, C Cappelle, F Corucci, A Bernatskiy, N Cheney, J Bongard. (2017).  
[Simulating the evolution of soft and rigid-body robots.](#)  
*Genetic and Evolutionary Computation Conference (GECCO)*, 1117-1120.
3. F Corucci, N Cheney, S Kriegman, J Bongard, C Laschi. (2017).  
[Evolutionary developmental soft robotics as a framework to study intelligence and adaptive behavior.](#)  
*Frontiers in Robotics and AI*, 4(34).
2. S Kriegman, N Cheney, F Corucci, J Bongard. (2017).  
[A minimal developmental model can increase evolvability in soft robots.](#)  
*Genetic and Evolutionary Computation Conference (GECCO)*, 131-138, 10.1145/3071178.3071296.
1. S Kriegman, M Szubert, J Bongard, C Skalka. (2016).  
[Evolving spatially aggregated features from satellite imagery for regional modeling.](#)  
*Parallel Problem Solving from Nature (PPSN)*, 707-716.

#### PATENTS

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pending Engineered Multicellular Organisms.

#### AWARDS

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2021 [The Cozzarelli Prize](#), National Academy of Sciences

2020 Computer Science Graduate Award, University of Vermont

[Top 10 Most Influential BioTech Projects](#), Project Management Institute  
[Beazley Designs of the Year](#), The Design Museum

#### SERVICE

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2019– Co-developer, [Voxcraft](#): a low cost, open source soft robot design and construction kit for ages 12+

#### EDITORSHIPS

2020– Review Editorial Board, *Frontiers Robotics and AI*

#### ADVISING

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2020– [Sida Liu](#), Master's: Multi-robot reinforcement learning.

2019– [Caitlin Grasso](#), PhD: Awarded a NSF GRFP to study reconfigurable organisms.

2018– [David Matthews](#), Undergrad: Differentiable physics.

#### INVITED TALKS

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Mar, 2021 “Protean machines”. IT University of Copenhagen.

Mar, 2021 “Living robots”. *The Int'l Workshop on Embodied Intelligence*.

Mar, 2021 “How to evolve your robot”. Guest lecture, Introduction to Soft Robotics, Yale University.

Oct, 2020 “[Living deepfakes](#)”. Guest lecture for the MIT Media Lab's Deepfakes course (MAS.S60).

Apr, 2020 “[Computer designed organisms](#)”. *Artificial Life Virtual Seminar Series*.

#### RECORDED PRESENTATIONS

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May, 2020 “[Design for soft robot blocks](#)”. *IEEE International Conference on Soft Robotics (RoboSoft)*.

June, 2019 “[Shapeshifting robots](#)”. *Robotics: Science and Systems (RSS)* in Freiburg, Germany.

#### INTERVIEWS

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Feb, 2021 “[Evolving robot forms](#)”. *Time Horizons Podcast*

Sep, 2020 “[Tiny, Programmable, Living Robots](#)”. *Constant Wonder*

Apr, 2020 “[Soft Robotics with Sam Kriegman](#)”. *IEEE Soft Robotics Podcast*

Mar, 2020 “[Xenobots](#)”. *Futureproof*

Feb, 2020 “[Living Robots](#)”. *TalkSport Radio*

Jan, 2020 “[UVM researchers develop tiny living robots](#)”. *WCAX (CBS 3)*

Jan, 2020 “[UVM aids in creating living robots](#)”. *WPTZ (NBC 5)*

Jan, 2020 “[Forscher haben erstmals 'lebende' Mini-Roboter erschaffen](#)”. *Die Welt*

#### SELECTED MEDIA COVERAGE

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Mar, 2021 “[Scientists create new 'living robots' that have memory and assemble themselves](#)”. *The Independent*

Mar, 2021 “[Cells Form Into 'Xenobots' on Their Own](#)”. *Quanta Magazine*

Mar, 2021 “[Living robots made from frog skin cells can sense their environment](#)”. *New Scientist*

Mar, 2021 “[Frog skin cells turned themselves into living machines](#)”. *Science News*

Dec, 2020 “[The big scientific breakthroughs of 2020](#)”. *The Week*

Dec, 2020 “[The 10 Most Spectacular Scientific Advances of 2020](#)”. *La Razón (Spain)*

Dec, 2020 “[Part Robot, Part Frog: Xenobots Are the First Robots Made From Living Cells](#)”. *Discover Magazine*

Nov, 2020 “[The Xenobot Future Is Coming – Start Planning Now](#)”. *Wired*

Apr, 2020 “[Meet the Xenobots: Virtual Creatures Brought to Life](#)”. *New York Times*

Feb, 2020 “Giant Moon rocket, living robots and quantum computer – January’s best science images”. *Nature*

Feb, 2020 “Tiny machines made from the stem cells of frogs”. *The Intelligence (Economist Radio)*

Feb, 2020 “Meet the Xenobot, the World’s First-Ever ‘Living’ Robot”. *Seeker*

Jan, 2020 “The religious, moral, and ethical implications of Xenobots”. *BBC Radio 4 Sunday*

Jan, 2020 “A research team builds robots from living cells”. *The Economist*

Jan, 2020 “Scientists use stem cells from frogs to build first living robots”. *The Guardian*

Jan, 2020 “Meet the xenobot: world’s first living, self-healing robots created from frog stem cells”. *CNN*

Jan, 2020 “Scientists create first living, self-healing robots (on-air with Fredricka Whitfield)”. *CNN*

Jan, 2020 “Meet Xenobot, an Eerie New Kind of Programmable Organism”. *Wired*

Jan, 2020 “Scientists Assemble Frog Stem Cells Into First ‘Living Machines’”. *Smithsonian Magazine*

Jan, 2020 “World’s First ‘Living Machine’ Created Using Frog Cells and Artificial Intelligence”. *Scientific American*

Jan, 2020 “These tiny living robots could help science eavesdrop on cellular gossip”. *Popular Science*

Jan, 2020 “These Are the First Living Robots: Machines Made from Frog Stem Cells”. *Popular Mechanics*

Jan, 2020 “Behold the xenobots – part frog, part robot. But are they alive?”. *Christian Science Monitor*

Jan, 2020 “Scientists at UVM, Tufts create ‘living robots’”. *Boston Globe*

Jan, 2020 “How tiny ‘biobots’ could enter bodies to clean arteries and administer drugs”. *The Times*

Jan, 2020 “Living robots created as scientists turn frog cells into ‘entirely new life-forms’”. *The Telegraph*

Jan, 2020 “Living Robots, Designed By Computer”. *Science Friday*

Jan, 2020 “Living robots”. *BBC World Service*

Jan, 2020 “These ‘xenobots’ are living machines designed by an evolutionary algorithm”. *MIT Technology Review*

Jan, 2020 “The ‘xenobot’ is the world’s newest robot – and it’s made from living animal cells”. *CTV News*

Jan, 2020 “World’s First ‘Living Robot’ Invites New Opportunities And Risks”. *Forbes*

Jan, 2020 “Tiny ‘xenobots’ made from cells could heal our bodies and clean the environment”. *Fox News*

Jan, 2020 “Scientists Create First ‘Living Robots’ in Major Breakthrough”. *The Independent*

Jan, 2020 “World’s first ‘living robots’ are made from the stem cells of frogs”. *New York Post*

Jan, 2020 “Algorithm Designs Robots Using Frog Cells”. *The Scientist*

Jan, 2020 “Xenobots: 1st living robots made from stem cells”. *ESPN*

Jan, 2020 “Xenobot”. *Wikipedia*