ERAN AGMON, Ph.D.

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PROFESSIONAL APPOINTMENTS

University of Connecticut Health Center, Farmington, CT *2022–present*
Assistant Professor of Molecular Biology and Biophysics,
Center for Cell Analysis and Modeling,
Biomedical Engineering Department

Stanford University, Stanford, CA *2017–2022*
Postdoctoral Research Fellow, Department of Bioengineering

Columbia University, New York City, NY *2016–2017*
Postdoctoral Research Scientist, Department of Biological Sciences

EDUCATION

Indiana University, Bloomington, IN *2016*
Joint Ph.D., Informatics and Computing, and Cognitive Science
Funding: NSF Integrative Graduate Education and Research Traineeship (IGERT) Fellowship

Portland State University, Portland, OR *2011*
M.Sc. in Systems Science

University of California, San Diego, San Diego, CA *2009*
B.S., Cognitive Science (minor in Biology)

PUBLICATIONS

Published:

1. Skalnik, C. J., Cheah, S. Y., Yang, M. Y., Wolff, M. B., Spangler, R. K., Talman, L., Morrison, J.H., Peirce, S.M., **Agmon, E.**, and Covert, M. W. (2023). Whole-cell modeling of E. coli colonies enables quantification of single-cell heterogeneity in antibiotic responses. PLOS Computational Biology, 19(6), e1011232.
2. Johnson, G. T., **Agmon, E.**, Akamatsu, M., Lundberg, E., Lyons, B., Ouyang, W., Quintero-Carmona, O. and Riel-Mehan, M., Rafelski, S., and Horwitz, R. (2023). Building the next generation of virtual cells to understand cellular biology. Biophysical Journal.
3. Shaikh, B., Smith, L. P., Vasilescu, D., Marupilla, G., Wilson, M., **Agmon, E.**, [...] and Karr, J. R. (2022). BioSimulators: a central registry of simulation engines and services for recommending specific tools. Nucleic Acids Research: https://doi.org/10.1093/nar/gkac331
4. **Agmon, E.**, Spangler, R.K., Skalnik, C.J., Poole, W., Morrison, J.H., Peirce, S.M., and Covert, M.W. (2022). Vivarium: an interface and engine for integrative multi-scale modeling in computational biology. *Bioinformatics*, 38(7), 1972-1979.
5. Covert, M.W., Gillies, T.E., Kudo, T., and **Agmon, E.** (2021). A forecast for large-scale, predictive biology: lessons from meteorology. *Cell Systems*, 12: 6.
6. **Agmon, E.**, and Spangler, R.K. (2020). A multi-scale approach to modeling *E. coli* chemotaxis. *Entropy*, 22: 1101.
7. Macklin, D.N., Ruggero, N.A., Carrera, J., Choi, H., Horst, T.A., Mason, J.C., Sun, G., **Agmon, E.**, DeFelice, M.M., Maayan, I., Lane, K., Spangler, R.K., Gillies, T.E., Paull, M.L., Akhter, S., Bray, S.R., Weaver, D.S., Keseler, I.M., Karp, P.D., Morrison, J.H., and Covert, M.W. (2020). Simultaneous cross-evaluation of heterogeneous *E. coli* datasets via mechanistic simulation. *Science*, 369, eaav3751.

8. Talman, L., **Agmon, E.**, Peirce, S.M., and Covert, M.W. (2019). Multiscale models of infection. *Current Opinion in Biomedical Engineering*, 11, 102-108.
9. **Agmon, E.**, Solon, J., Bassereau, P., and Stockwell, B.R. (2018). Modeling the effects of lipid peroxidation during ferroptosis on membrane properties. *Scientific Reports*, 8(1): 5155.
10. **Agmon, E.** and Stockwell, B.R. (2017). Lipid homeostasis and regulated cell death. *Current Opinion in Chemical Biology*. 39: 83-89.
11. **Agmon, E.**, Gates, A.J., and Beer, R.D. (2016). The structure of ontogenies in a model protocell. *Artificial Life* 22 (4): 499-517.
12. Taylor, T., Bedau, M. A., Channon, A., et al. (2016). Open-Ended Evolution: Perspectives from the OEE1 Workshop in York. *Artificial Life* 22 (3): 408-423.
13. **Agmon, E.**, Gates, A.J., Churavy, V. and Beer, R.D. (2016). Exploring the space of viable configurations in a model of metabolism-boundary co-construction. *Artificial Life*, 22 (2): 153-171.
14. **Agmon, E.**, & Beer, R. D. (2014). The evolution and analysis of action switching in embodied agents. *Adaptive Behavior*, 22(1), 3-20.
15. **Agmon, E.** (2014). Action Switching in Brain-Body-Environment Systems. In *Guided Self-Organization: Inception* (pp. 295-318). Springer Berlin Heidelberg.

In review:

1. Hickey, J.W., **Agmon, E.**, Horowitz, N., Lamore, M., Sunwoo, J., Covert, M.W., and Nolan, G.P. (in preparation). Integrating Multiplexed Imaging and Multiscale Modeling Identifies Tumor Phenotype Transformation as a Critical Component of Therapeutic T Cell Efficacy.
2. Hickey J.W., Horowitz, N., Caraccio, C., Tan, Y., Clave, X.R., Zhu, B., Vasquez, G., Barlow, G., **Agmon, E.**, Goltsev, Y., Sunwoo, J., Covert, M.W., and Nolan, G.P (in preparation). Therapeutic T Cells Can Drive Tumor Tissue Restructuring Critical for Mounting a Coordinated Immune Response.

Selected conference proceedings:

1. Covert, M.W., and **Agmon, E.** (2019). Building whole-cell computational models to predict cellular phenotypes and accelerate discovery. *Proceedings of the Solvay Conference in Chemistry.*
2. **Agmon, E.**, Glazier, J.A, and Beer, R.D. (2017). Structural Coupling of a Potts Model Cell. *Proceedings of the 14th European Conference on Artificial Life 2017*, (pp. 13-20). MIT Press.
3. Virgo, N., **Agmon, E.**, and Fernando, C. (2017). Lineage selection leads to evolvability at large population sizes. *Proceedings of the Fourteenth European Conference on Artificial Life*, (pp. 420-427). MIT Press.
4. **Agmon, E.**, Gates, A.J., and Beer, R.D. (2015). Ontogeny and adaptivity in a model protocell. In P. Andrews, L. Caves, R. Doursat, S. Hickinbotham, F. Polack, S. Stepney, T. Taylor & J. Timmis (Eds.), *Proceedings of the European Conference on Artificial Life 2015* (pp. 216-223). MIT Press. **[Winner of Best Paper Award]**
5. **Agmon, E.**, Gates, A.J., Churavy, V. and Beer, R.D. (2014). Quantifying robustness in a spatial model of metabolism-boundary co-construction. In H. Sayama, J. Rieffel, S. Risi, R. Doursat & H. Lipson (Eds.), *Artificial Life 14: Proceedings of The Fourteenth International Conference on the Synthesis and Simulation of Living Systems* (pp. 514-521). MIT Press.

GRANTS

C-CoMP Faculty Fellowship 2022-present
Center for Chemical Currencies of a Microbial Planet.

NIH P41 2022-present
Center for Reproducible Biomedical Modeling.

DARPA ASKEM 2022-present
Building a Causal Inference Engine for Multi-Scale Simulations.

NIH F32 Postdoctoral Fellowship 2020-2022
Adding an environment and motility in a whole-cell model of Escherichia coli

NSF IGERT Fellowship. *Brain-Body-Environment Systems in Behavior and Cognition.* 2011–2015

HONORS AND AWARDS

Faculty Fellow, *NSF Center for Chemical Currencies of a Microbial Planet (C-CoMP)* 2023
Outstanding Dissertation Award, *Indiana University Cognitive Science.* 2017
Best Paper Award, *European Conference on Artificial Life.* 2015
1st Place Poster, *NSF IGERT Research Showcase.* 2015
Outstanding Teaching Award, *Indiana University Cognitive Science.* 2014
1st Place Poster, *NSF IGERT Research Showcase.* 2014
Supplemental Research Fellowship, *Cognitive Science Program.* 2014

OTHER AFFILIATIONS

NASA Ames Research Center Moffett Field, CA
Research Affiliate, Center for the Emergence of Life *2021*
• Collaborated on machine learning approaches to modeling RNA synthesis and selection at the origin of life.

Institute for Advanced Study Princeton, NJ
Visiting Scholar, Program in Interdisciplinary Studies *2016–2017*
• Co-founded YHouse, a research institute focused on artificial intelligence and the science of awareness.

Tokyo Institute of Technology Tokyo, Japan
Visitor, Earth-Life Science Institute Origins Network *2017*
• Worked with an interdisciplinary group of scientists to model molecular evolution at the origins of life.

TEACHING AND MENTORSHIP

Stanford University Bioengineering *2019–2022*
Research Mentor
• Mentored eight BS and PhD students in whole-cell modeling of *E. coli*.
• Organized meetings to teach systems biology concepts, review code, and establish collaborative practices.

SSRP-Amgen Scholars Program *2021*
Research Mentor
• This program provides training to undergraduate students who, by reason of their background would bring diversity to graduate study in the biomedical and biological sciences.

Build-A-Cell Chemical Reaction Network modeling tutorials *2020*
Co-instructor

Stanford International Genetically Engineered Machine (iGEM) competition *2019*
Mentor

Course: Autonomous Robotics 2014, 2016
Associate Instructor, Indiana University

Course: Brains & Minds, Robots & Computers 2013
Associate Instructor, Indiana University

PRESENTATIONS

1. **Akamatsu M. & Agmon E.** "Modular multiscale simulations of endocytic actin networks using Vivarium." *Find Your Inner Modeler V, 2022.*
2. **Agmon E.** "Vivarium: an interface and engine for integrative multi-scale modeling." *COMBINE 2021.*

3. **Agmon E.** "Vivarium: an interface and engine for multi-scale modeling in computational biology." *Build-A-Cell workshop.* NIST, Gaithersburg, MD, 2020.
4. **Agmon E.** "A multi-scale platform for whole-cells and colonies." *Basement seminar.* Stanford Bioengineering Department, 2020.
5. **Agmon E.** "Structural coupling of a Potts model cell." *14th European Conference on Artificial Life.* Lyon, France, 2017.
6. **Agmon E.** "Computational models of heterogeneous lipid membranes." *Frontiers in Computing Systems.* Columbia University, NY, 2017.
7. **Agmon E.** "Simulations of Ferroptosis." *p53 Multi-Group meeting.* Columbia University, NY, 2017.
8. **Agmon E.** "The biological foundations of enactivism." *Workshop on the Biological Foundations of Enactivism, at Artificial Life 16.* Cancun, Mexico, 2016.
9. **Agmon E.** "Whole-cell models and perturbation-based analysis." *Department of Biological Sciences.* Columbia University, NY, 2016.
10. **Agmon E.** "The dynamics of protocell ontogenies." *ENSO online seminar.* 2016.
11. **Agmon E.** "Ontogeny and adaptivity in a model protocell." *Evolutionary Systems Biology Lab.* Albert Einstein College of Medicine, NY, 2016.
12. **Agmon E.** "Action switching in embodied, dynamical agents." *Workshop on self-organization in brain-body-environment system.* University of Cincinnati, OH, 2015.
13. **Agmon E.** "Ontogeny and adaptivity in a model protocell." *ECAL 15.* York, UK, 2015.
14. **Agmon E.** "The physiology and metabolic closure of organisms." *Workshop on the causal factors of robustness and plasticity in living systems.* Bloomington, IN, 2014.
15. **Agmon E.** "Biological individuation, ontogeny and adaptation." *Cognitive Science Program.* Bloomington, IN, 2015.
16. **Agmon E.** "Quantifying robustness in a spatial model of metabolism-boundary co-construction." *Artificial Life 14.* New York City, NY, 2014.
17. **Agmon E.** "Action switching in embodied, dynamical agents." *4th Annual Midwest Cognitive Science Conference.* Dayton, OH, 2014.

SELECTED WORKSHOPS AND SEMINARS

Build-A-Cell. *Stanford University.*	2022
Find Your Inner Modeler. *University of Illinois, Chicago.*	2022
COMBINE (virtual).	2021
Build-A-Cell. *California Institute of Technology.*	2022
Build-A-Cell (virtual). *Hosted by NIST.*	2020
Build-A-Cell. *NASA Ames, Mountain View, CA.*	2020
qBio. *San Francisco, CA.*	2019
Agency in the Physical Sciences, at Artificial Life 17. *Lyon, France.*	2017
Frontiers in Computing Systems. *Columbia University.*	2017
Expanding Views on the Emergence of the Biosphere: 5th ELSI International Symposium. *Tokyo Institute of Technology, Tokyo, Japan.*	2017
The Biological Foundations of Enactivism, at Artificial Life 16. *Cancun, Mexico.*	2016
Re-conceptualizing the Origins of Life. *Carnegie Institution for Science, Washington D.C.*	2015
Self-organization in brain-body-environment systems. *University of Cincinnati.*	2015
Towards an Integrative Approach to the Study of Awareness. *Kobe University.*	2015
Causal Factors of Robustness and Plasticity in Living Systems. *Indiana University.*	2014
New England Complex Systems Institute. *Massachusetts Institute of Technology.*	2010

PROFESSIONAL SERVICE

Reviewer. *Bioinformatics.* 2022

Reviewer. *International Workshop on Bio-Design Automation (IWBDA).* 2022

Member. *Engineering Biology Research Consortium (EBRC).* 2022-present

Member. *Biomedical Engineering Society (BMES).* 2021-present

Reviewer. *IEEE International Conference on Bioinformatics & Biomedicine (BIBM).* 2019

Program committee. *International Conference on Complex Systems (ICCS).* 2018

Associate Editor. *Journal of Adaptive Behavior.* 2016-present

Program committee. *Conference on Complex Systems.* 2017

Organizer. *Workshop on Agency in the Physical Sciences, at the ECAL 17* 2017

Organizer. *The Biological Foundations of Enactivism, at Artificial Life 16* 2016

Program committee. *Conference on Artificial Life.* 2016–2020

Program committee. *Artificial Life 15: The Fifteenth International Conference on the Synthesis and Simulation of Living Systems.* 2016

Reviewer. *Artificial Life Journal* 2015–present

Organizer. *E-cog: weekly meeting on Embodied, Embedded, and Enactive approaches in Cog Sci* 2013–2015

Organizer. *Workshop on the Causal Factors of Robustness and Plasticity in Living Systems.* 2014