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# ERAN AGMON, Ph.D.

Email: agmon@uchc.edu • Mobile: (650) 823-6106 • Website: eagmon.github.io

## PROFESSIONAL APPOINTMENTS

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**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  
*Funding:* NIH F32 Fellowship

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

## EDUCATION

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**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

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- 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.
- 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*.
- 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>
- 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.
- 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.
- Agmon, E.**, and Spangler, R.K. (2020). A multi-scale approach to modeling *E. coli* chemotaxis. *Entropy*, 22: 1101.
- 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

<b>C-CoMP Faculty Fellowship</b> <i>Center for Chemical Currencies of a Microbial Planet.</i>	2022-present
<b>NIH P41</b> <i>Center for Reproducible Biomedical Modeling.</i>	2022-present
<b>DARPA ASKEM</b> <i>Building a Causal Inference Engine for Multi-Scale Simulations.</i>	2022-present
<b>NIH F32 Postdoctoral Fellowship</b> <i>Adding an environment and motility in a whole-cell model of Escherichia coli</i>	2020-2022

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

## HONORS AND AWARDS

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**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

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**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

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**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

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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.

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## SELECTED WORKSHOPS AND SEMINARS

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

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## PROFESSIONAL SERVICE

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<b>Reviewer.</b> <i>Bioinformatics.</i>	2022
<b>Reviewer.</b> <i>International Workshop on Bio-Design Automation (IWBDA).</i>	2022
<b>Member.</b> <i>Engineering Biology Research Consortium (EBRC).</i>	2022-present
<b>Member.</b> <i>Biomedical Engineering Society (BMES).</i>	2021-present
<b>Reviewer.</b> <i>IEEE International Conference on Bioinformatics &amp; Biomedicine (BIBM).</i>	2019
<b>Program committee.</b> <i>International Conference on Complex Systems (ICCS).</i>	2018
<b>Associate Editor.</b> <i>Journal of Adaptive Behavior.</i>	2016-present
<b>Program committee.</b> <i>Conference on Complex Systems.</i>	2017
<b>Organizer.</b> <i>Workshop on Agency in the Physical Sciences, at the ECAL 17</i>	2017
<b>Organizer.</b> <i>The Biological Foundations of Enactivism, at Artificial Life 16</i>	2016
<b>Program committee.</b> <i>Conference on Artificial Life.</i>	2016–2020
<b>Program committee.</b> <i>Artificial Life 15: The Fifteenth International Conference on the Synthesis and Simulation of Living Systems.</i>	2016
<b>Reviewer.</b> <i>Artificial Life Journal</i>	2015–present
<b>Organizer.</b> <i>E-cog: weekly meeting on Embodied, Embedded, and Enactive approaches in Cog Sci</i>	2013–2015
<b>Organizer.</b> <i>Workshop on the Causal Factors of Robustness and Plasticity in Living Systems.</i>	2014