

## Constantine Glen Evans

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### Education

Ph.D., Physics, California Institute of Technology, 2014. Thesis advisor: Erik Winfree. Thesis title: “[Crystals that count! Physical principles and experimental investigations of DNA tile self-assembly.](#)”

M.S., Physics, California Institute of Technology, 2011.

B.S. with Highest Distinction, Physics, University of California, San Diego, 2005.

### Professional Positions

2024 – present, Maynooth University Hamilton Institute, Research Fellow.

2021 – 2024, Maynooth University Hamilton Institute, Senior Postdoctoral Researcher.

2019 – 2021, Maynooth University Hamilton Institute, Postdoctoral Researcher.

2010 – present, Evans Foundation, Scientific Director.

2015 – 2020, California Institute of Technology, Visiting Scholar.

2014 – 2015, California Institute of Technology, Postdoctoral Researcher.

2000 – 2004, Egea Biosciences, Research Assistant.

### Refereed Journal Publications

Ravasio, R., Husain, K., Evans, C. G., Phillips, R., Ribezzi, M., Szostak, J. W. & Murugan, A. A minimal scenario for the origin of non-equilibrium order. In preparation

Evans, C. G., O’Brien, J., Winfree, E. & Murugan, A. [Pattern recognition in the nucleation kinetics of non-equilibrium self-assembly.](#) *Nature* (2024)

Evans, C. G. & Winfree, E. [Physical principles for DNA tile self-assembly.](#) *Chemical Society Reviews* **46**, 3808–3829 (2017)

Evans, C. G., Hariadi, R. F. & Winfree, E. [Direct atomic force microscopy observation of DNA tile crystal growth at the single-molecule level.](#) *J. Am. Chem. Soc.* **134**, 10485–10492 (2012)

### Invited Talks

Hamilton Institute Seminar, February 2020.

Molecular Programming Project Finale Workshop, June 2019.

Self-assembly, Geometry, and Computation Workshop, International Conference on Unconventional Computation and Natural Computation 2018, June 2018.

Gordon Research Conference on Self-Assembly and Supramolecular Chemistry, May 2015.

### Refereed Conference Publications

Evans, C. G. & Winfree, E. [Optimizing tile set size while preserving proofreading with a DNA self-assembly compiler.](#) in *DNA Computing and Molecular Programming* (eds Doty, D. & Dietz, H.) (Springer International Publishing, 2018), 37–54

Evans, C. G. & Winfree, E. [DNA sticky end design and assignment for robust algorithmic self-assembly.](#) in *DNA Computing and Molecular Programming* (eds Soloveichik, D. & Yurke, B.) (Springer International Publishing, 2013), 61–75

## Conference Talks

Evans, C., Doty, D. & Woods, D. *Growth dynamics: Precisely controlled self-assembly order of DNA tile nanostructures*. 28th International Conference on DNA Computing and Molecular Programming. 2022

Evans, C. G., O'Brien, J., Winfree, E. & Murugan, A. *Pattern recognition in the nucleation kinetics of molecular self-assembly*. 17th Annual Conference on Foundations of Nanoscience ([online](#))

Evans, C. G., O'Brien, J., Winfree, E. & Murugan, A. *Kinetic control of spontaneous nucleation in uniquely-addressed multifarious self-assembly*. 25th International Conference on DNA Computing and Molecular Programming. 2019

## Service

- International Conference on DNA Computing and Molecular Programming (DNA): Program Committee Co-chair (2023), Program Committee Member (2021, 2022, 2023, 2024), Session Chair (2018, 2020).
- Gordon Research Conference on Self-Assembly and Supramolecular Chemistry: Session Chair (2017).
- Reviews for Applied Physics Letters, Journal of Physical Chemistry, ACS Applied Bio Materials, DNA.
- Maynooth University Faculty of Science and Engineering: Hamilton Institute postdoctoral representative (2021-present).

## Software Packages

- [QSLib](#): qPCR machine control and processing for non-qPCR and qPCR applications.
- [Alhambra](#) DNA tileset designer, [StickyDesign](#) DNA sticky end designer (associated publications listed previously).
- [Alhambra-mixes](#) pipetting/lab recipe designer.
- [Rgrow](#) modular tileset assembly simulator with growth and nucleation simulations.
- [Kithairon](#): Echo liquid handler control and processing for general and hierarchical-mix applications.
- [Scikits-Bootstrap](#): bootstrapping statistics library for Python/NumPy.
- Maintainer of [Xgrow](#), [PepperCompiler](#), [Nix's Gwyddion AFM package](#), and unofficial ArchLinux and Debian packages for oxDNA.
- Contributions to [SpuriousSSM](#), [Seaborn](#), [Pint](#), [oxDNA](#), [Scadnano](#), [Nuad](#), [Jupyter](#), [Matplotlib](#), [Pandas](#), and other projects.

## Non-Refereed Publications

(eds Chen, H.-L. & Evans, C. G.) *29th International Conference on DNA Computing and Molecular Programming (DNA 29), LIPIcs 276* (Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl, Germany, 2023) (as editor)

Evans, C. G. *Experimental implementation of tile assembly*. in *Encyclopedia of Algorithms* (ed Kao, M.-Y.) (Springer, Berlin, Heidelberg, 2014)

Evans, C. G. *Crystals that count! Physical principles and experimental investigations of DNA tile self-assembly*. PhD thesis (California Institute of Technology, 2014)

## Conference Talks (other than presenter/primary author)

Rogers, T., Evans, C. & Woods, D. *Covered DNA core tiles for robust tuning of spurious nucleation*. 28th International Conference on DNA Computing and Molecular Programming. 2022

O'Brien, J., Evans, C., Winfree, E. & Murugan, A. Winner-take-all dynamics in self-assembly. *APS March Meeting* (Mar. 2021)

Evans, C., O'Brien, J., Winfree, E. & Murugan, A. Pattern recognition through molecular self-assembly. *APS March Meeting*. (O'Brien presenting) (Mar. 2020)

## Research Advisees

- Antoine Anastassiades (2023): graduate internship, supervised work on implementation of an algorithmic DNA tile assembly system with algorithmically-calculated structure shapes.
- Clément Galan (2022): graduate internship, supervised work on design and implementation of an algorithmic DNA tile assembly system with algorithmically-calculated structure shapes.
- Ahmed Shalaby (2022): graduate intership and PhD student of Damien Woods. Co-supervised work on facet tile assembly models (presented at DNA28, 2022, “Facet TAM: An abstract tile assembly model with facet growth”)
- Jackson O’Brien (2018 – 2021): Ph.D. student of Arvind Murugan at University of Chicago. Unofficially co-supervised work on pattern recognition (Nature, 2024, DNA 2019, FNANO 2020, APS March Meeting 2020, 2021). Ph.D., Physics, 2021, Thesis title “Pattern Recognition through Molecular Computation.”
- Chigozie Nri (2015): Ph.D. student on rotation in Winfree group at Caltech. Unofficially supervised experimental work on self-assembly, and work on the Stickydesign and Peppercompiler software packages.

## Teaching

- 2013, Caltech, Biomolecular Computation (BE/CS/CNS/Bi 191a and b). Teaching assistant; instructor Erik Winfree.
- 2011, Caltech, Biomolecular Computation (BE/CS/CNS/Bi 191a). Guest lectures on DNA self-assembly; instructor Erik Winfree.
- 2005-2006, 2006-2007, Caltech, Senior Physics Laboratory (Ph 77a/b). Teaching assistant / supervision of the nuclear physics track; instructors Eric Black and Kenneth Libbrecht.

Last updated 2024-01-31.