Salvador Buse

Bioengineering PhD Student at Caltech

sbuse@caltech.edu | salvadorbuse.com | salvadorbuse | salvadorbuse | @SalvadorBuse

Education

California Institute of Technology (Caltech) *Pasadena, California*

PhD in Bioengineering *Sep 2020 -*

- Studying pattern formation, associative memory, chemical neural networks, and synthetic biology with Erik Winfree
- G1 courses: data analysis and statistical inference in Python, biomolecular computation, mathematical biology
- G2 courses: networks of relations, probability models, machine learning theory

University of Cambridge, Trinity College *Cambridge, UK*

MSci in Natural Sciences (Systems Biology) – First Class, 76% *Oct 2019 - Jul 2020*

BA in Natural Sciences (Chemistry) – Upper Second Class, 68% *Oct 2016 - Jul 2019*

Research Experience

California Institute of Technology (Caltech) *Pasadena, California*

PhD Student, Erik Winfree Lab *Sep 2020 -*

- Researching pattern formation and morphogenesis in neural reaction-diffusion systems.

Laboratory of Molecular Biology *Cambridge, UK*

Master's Thesis Student, Jason Chin Lab *Nov 2019 - Apr 2020*

- To enable bacteria to make proteins containing up to three unnatural amino acids, the Chin lab built 'Syn61', an *E. coli* strain whose genome uses only 61 of 64 codons, and is the largest synthesised to date. This works by 'recoding': synonymously replacing all instances of three codons. I found that Syn61 still contains some recoded codons, and and studied their implications for Syn61 and future recoded genomes.

Medical Research Council Summer Student, Jason Chin Lab *Jun 2019 - Sep 2019*

- In Syn61, recoded codons are 'blank': they do not encode natural amino acids, so can be assigned to unnatural amino acids. First, however, the tRNAs recognising recoded codons must be removed. I deleted those tRNAs and found the new Syn61 strain to be viable, but less fit.

Stanford University, Chemical and Systems Biology *Palo Alto, California*

Summer Research Intern, Jim Ferrell Lab *Jun 2018 - Aug 2018*

- Studied the role of an APC/C subunit in cell cycle regulation.

University of Cambridge, Physiology Department *Cambridge, UK*

Summer Research Intern, Bill Harris Lab *Jul 2017 - Sep 2017*

- Collected data and wrote code to study the role of nuclear migration in retinal development.

Leadership

Cambridge University Scientific Society *Cambridge, UK*

Co-President *Mar 2018 - Mar 2019*

- Arranged a weekly lecture series of 15 scientists, and co-chaired a research internships event. Helped to renew our relationship with Oxford's Science Society, and jointly arranged a formal dinner in Cambridge and a field trip to the London Natural History Museum.

Trinity College Science Society *Cambridge, UK*

President *Mar 2017 - Mar 2018*

- Arranged a weekly lecture series of 17 scientists, which featured Sir Paul Nurse & Dame Ottoline Leyser. Organised a research internships event, which now occurs annually, and a symposium showcasing research at Trinity.

Writing and Publications

- Azizi A., Herrmann A., Wan Y., **Buse S.**, Keller P. J., Goldstein R., & Harris W. A. (Oct 2020). Nuclear crowding and nonlinear diffusion during interkinetic nuclear migration in the zebrafish retina. eLife. DOI: 10.7554/eLife.58635
- Robertson W., Funke L., De La Torre D., Fredens J., Elliot T., Spink M., Christova Y., Cervettini D., Boge F., Liu K., **Buse S.**, Maslen S., Salmond G., Chin J. (Jun 2021). Sense codon reassignment enables viral resistance and encoded polymer synthesis. Science. DOI: 10.1126/science.abg3029

Profile

I'm interested in using synthetic biology to understand life and build technologies which benefit humanity. I consider myself to be part of the effective altruism community, and care a great deal about our long-term future. I believe that the misuse of synthetic biology could pose an existential threat, and hope to use my career to help mitigate that risk. I won a Silver Medal at the International Biology Olympiad in 2016, and Gold Medals in the national Physics, Chemistry, and Biology Olympiads in 2015 & 16. I can code well in Python and OK in Mathematica and MATLAB. I love to travel and am fascinated by world history, and am lucky enough to have visited more than 40 countries.