

Dr. Paul Jaschke

3/4-6 Helen St., Lane Cove North, NSW 2006 AUSTRALIA

Phone: +61-4-1532-9107

Twitter: @PaulJaschke

LinkedIn: <https://www.linkedin.com/in/pauljaschke/>

Email: paul.jaschke@mq.edu.au

Website: <http://www.jaschke-lab.science/>

SUMMARY

Synthetic Biologist with diverse research expertise from designing and building synthetic viruses to making genetic switches for orthogonal translation to create proteins with new properties. Proven track record in scientific publications, mentoring, and leadership. Science entrepreneur with experience creating startup company within the pharmaceutical industry ecosystem.

Specialties and keywords: Synthetic Biology, Molecular Biology, Genome Engineering, Bacteriophages, Phage Therapy, Antimicrobial Resistance, tRNA, Start Codons, Next-Generation Sequencing.

EDUCATION

Postdoctorate in Bioengineering 2010 - 2015

Stanford University, USA

Mentor: Drew Endy

Topic: *Exploring functional genome sequence space using synthetic refactored bacteriophage genomes*

Ph.D. in Microbiology 2010

University of British Columbia, Canada

Supervisor: JT Beatty

Dissertation: *Discovery and characterization of a new zinc chlorophyll biosynthetic pathway and photosystem in a magnesium-chelatase mutant*

B.Sc. First-Class Honours Biochemistry 2003

University of Alberta, Canada

Supervisor: Marek Michalak

Honors Thesis: *The role of calreticulin in cardiomyocyte differentiation*

PROFESSIONAL WORK EXPERIENCE

Lecturer in Synthetic Biology, Macquarie University 2015-Present

Co-founder and CSO Hyperdrive Science, Sydney, Australia 2019-Present

Synthetic Biology Lab Safety and Gene Technology Compliance Supervisor, MQ 2015-Present

Scientist in Residence – Autodesk Research, San Francisco, USA 2015

Postdoctoral Research Fellow – Dept. Bioengineering, Stanford University 2010-2015

Graduate Student Instructor – Dept. of Microbiology, The University of British Columbia 2005-2008

Research Technician – Dept. Chemistry, University of Queensland 2004

AHFMR Undergraduate Research Assistant – Dept. Biochemistry, University of Alberta 2002/2003

PEER-REVIEWED PUBLICATIONS

indicates first author(s). Asterix (*) indicates corresponding author. Underlined indicates students under my direct supervision.

1. Wright BW#, Molloy MP, and **Jaschke PR***. (2021). Overlapping genes in natural and engineered genomes. (Under Review).
2. Hutvagner A#, Scopelliti D#, Whelan F, and **Jaschke PR***. (2021). Orthogonal translation using the non-canonical initiator-tRNA(AAC) alters protein sequence and stability *in vivo*. (Under Review).
3. Trofimova E# and **Jaschke PR***. (2021). Plaque Size Tool: an automated plaque analysis tool for simplifying and standardising bacteriophage plaque morphology measurements. *Virology*. 561: 1-5. DOI: 10.1016/j.virol.2021.05.011
4. Wright BW#, Logel DY, Mirzai M, Pascovici D, Molloy MP, and **Jaschke PR***. (2021). Proteomic and transcriptomic analysis of *Microviridae* ϕ XI74 infection reveals broad up-regulation of host membrane damage and heat shock responses. *mSystems*. 6, 3, e00046-21. DOI: 10.1128/mSystems.00046-21
5. Wright BW#, Ruan J, Molloy MP, **Jaschke PR***. (2020). Genome modularization reveals overlapped gene topology is necessary for efficient viral reproduction. *ACS Synthetic Biology*. 9, 11, 3079–3090. DOI: 10.1021/acssynbio.0c00323
6. Logel DY# and **Jaschke PR***. (2020). A high-resolution map of bacteriophage ϕ X174 transcription. *Virology*. 547:47-56. DOI: 10.1016/j.virol.2020.05.008
7. Weynberg K## & **Jaschke PR**.(2020). Building Better Bacteriophage with Biofoundries to Combat Antibiotic Resistant Bacteria. *PHAGE: Therapy, Applications, and Research*. 1, 1, 23-26. DOI:10.1089/phage.2019.0005
8. **Jaschke PR##**. (2020). Simulated sandwich enzyme-linked immunosorbent assay (ELISA) for a cost-effective investigation of natural and engineered cellular signaling pathways. *Biochemistry and Molecular Biology Education*. 18 September. DOI: 10.1002/bmb.21304
9. **Jaschke PR##**, Dotson GA, Hung K, Liu D, Endy E*. (2019). Definitive demonstration by synthesis of genome annotation completeness. *Proceedings of the National Academy of Sciences of the USA*. 116 (48) 24206-24213. DOI: 10.1073/pnas.1905990116
10. Vincent RM#, Yiasemides PF, **Jaschke PR***. (2019). An orthogonal amber initiator tRNA functions similarly across diverse *Escherichia coli* laboratory strains. *ScienceMatters*. 1 May 2019. DOI: 10.19185/matters.201904000009
11. Vincent RM#, Wright BW, **Jaschke PR***. (2019). Measuring amber initiator tRNA orthogonality in a genomically recoded organism. *ACS Synthetic Biology*. Apr 19;8(4):675-685. DOI: 10.1021/acssynbio.9b00021

12. Hecht A#, Glasgow J#, **Jaschke PR#**, Bawazer L, Munson MS, Cochran J, Endy D, Salit M*. (2017). Measurements of translation initiation from all 64 codons in *E. coli*. *Apr* 20;45(7):3615-3626. DOI: 10.1093/nar/gkx070
 - Designated ‘Breakthrough Article’ by journal reviewers and editors (less than 1% of articles)
13. Bates M#, Berliner A, Lachoff J, **Jaschke PR**, Groban E* (2016). Wet Lab Accelerator: A Web-Based Application Democratizing Laboratory Automation for Synthetic Biology. *ACS Synthetic Biology*. 6 (1): 167–171. DOI: 10.1021/acssynbio.6b00108
14. **Jaschke PR#**, Lieberman EK, Rodriguez J, Sierra A, Endy D*. (2012). A fully decompressed synthetic bacteriophage ϕ X174 genome assembled and archived in yeast. *Virology*. 434(2):278-84. DOI: 10.1016/j.virol.2012.09.020.
 - Selected for journal cover and featured in Scitable by Nature Education blog Bio 2.0
15. Neupane B, **Jaschke P**, Saer R, Beatty JT, Reppert M, Jankowiak R*. (2012). Electron transfer in *Rhodobacter sphaeroides* reaction centers containing Zn-bacteriochlorophylls: a hole-burning study. *Journal of Physical Chemistry B*. 116(10):3457-66. DOI: 10.1021/jp300304r
16. **Jaschke PR#**, Hardjasa A, Digby EL, Hunter CN, Beatty JT*. (2011). A *bchD* (Mg-chelatase) mutant of *Rhodobacter sphaeroides* synthesizes zinc bacteriochlorophyll through a novel zinc-containing pathway. *Journal of Biological Chemistry*. 286(23):20313-22. DOI: 10.1074/jbc.M110.212605
17. **Jaschke PR#**, Drake I, Beatty JT*. (2009). Modification of a French pressure cell to improve microbial cell disruption. *Photosynthesis Research*. 102(1): 95-7. DOI: 10.1007/s11120-009-9493-4
18. Lin S, **Jaschke PR**, Wang H, Paddock M, Tufts A, Allen JP, Rosell FI, Mauk GA, Woodbury NW, Beatty JT*. (2009). Electron transfer in the *Rhodobacter sphaeroides* reaction center assembled with zinc bacteriochlorophyll. *Proceedings of the National Academy of Sciences of the USA*. 106(21): 8537-42. DOI: 10.1073/pnas.0812719106
19. **Jaschke PR#**, LeBlanc HN, Lang AS, Beatty JT*. (2008). The PucC protein of *Rhodobacter capsulatus* mitigates an inhibitory effect of light-harvesting 2 alpha and beta proteins on light-harvesting complex 1. *Photosynthesis Research*. 95(2-3): 279-84. DOI: 10.1007/s11120-007-9258-x
20. **Jaschke PR#**, Beatty JT. (2007). The photosystem of *Rhodobacter sphaeroides* assembles with zinc bacteriochlorophyll in a *bchD* (magnesium chelatase) mutant. *Biochemistry*. 46(43): 12491-500. DOI: 10.1021/bi701407k
21. Loiselle FB, **Jaschke P**, Casey JR. (2003). Structural and functional characterization of the human NBC3 sodium/bicarbonate co-transporter carboxyl-terminal cytoplasmic domain. *Molecular Membrane Biology*. 20(4): 307-17. DOI: 10.1080/0968768031000122520

BOOK CHAPTERS

1. **Jaschke PR#**, Saer RG, Noll S, Beatty JT*. (2011). Modification of the genome of *Rhodobacter sphaeroides* and construction of synthetic operons. *Methods in Enzymology*. Vol 497: *Synthetic Biology*. Ch 23. 519-38. DOI: 0.1016/B978-0-12-385075-1.00023-8

NON-PEER REVIEWED PUBLICATIONS

1. Hutvagner A#, Scopelliti D#, Whelan F, and **Jaschke PR***. (2021). Orthogonal translation using the non-canonical initiator-tRNA(AAC) alters protein sequence and stability *in vivo*. *bioRxiv*. DOI: 10.1101/2021.05.25.445580
2. **Jaschke P**#, Lu J, Mulyasasmita W, Lee LJ. (2013). Incyte Pharmaceuticals Is Primed For A Run. *Seeking Alpha*. Article ID: 1156061. <https://seekingalpha.com/article/1156061-incyte-pharmaceuticals-is-primed-for-a-run>

HONORS AND AWARDS

Global Innovation Linkages Program – Round 3 (\$2m)	Submitted
NHMRC Ideas Grant - Treatment of multi-drug resistant infections using a novel, rapid and customised synthetic phage therapy platform (\$450K)	2020-2023
MQRIS-L High-capacity recombinant protein analysis system (\$150K)	2019
MRQIS-S Galleria Research Facility: Bringing a Flexible & Ethical Animal Model to MQ (\$88K)	2019
Minimum Viable Product (MVP) Grant, Jobs for NSW (Hyperdrive Science) (\$50K)	2019
CSIRO FSP Synthetic Biology Topup award (\$77K)	2018-2021
CSIRO FSP Synthetic Biology Topup award (\$34K)	2018-2020
NSW Dept. Industry - iGEM Team Award (\$35K)	2018
CSIRO ON Accelerate 4 Demo Night People's Choice Award - Hyperdrive Science	2018
CSIRO ON Accelerate 4 Finalist - Hyperdrive Science (\$30K)	2018
CSIRO ON Prime 3 Topup - Hyperdrive Science (\$5K)	2017
NSW Dept. Industry Skills and Regional Development - iGEM Team Award (\$10K)	2017
Biomolecular Discovery and Design Research Centre (\$150K/yr)	2016-2019
BioMolecular Frontiers Research Centre (\$50K)	2015
SB5.0 International Conference Travel Award	2011
Natural Sciences & Engineering Research Council Postdoctoral Fellowship (\$80K)	2010-2012
UBC Student Leader Award	2010
Sigma-Aldrich Award for Top Presentation at Life Sciences Institute Conference	2009
The Pacific Century Graduate Scholarship (\$10K)	2008
Beverly Green Award for Outstanding Research in the Field of Photosynthesis (\$750)	2008
John Richard Turner Fellowship in Microbiology (\$9K)	2007
University of BC Graduate Fellowship (\$7K)	2006/08
Natural Sciences & Engineering Research Council Postgraduate Scholarship (\$19K)	2005
Canadian Institutes of Health Research Presentation Award (\$100)	2003
Alberta Heritage Foundation for Medical Research Summer Studentship (\$5K)	2002/03
Jason Lang Scholarship (\$2K)	2000/02

PROFESSIONAL ACTIVITIES

Peer review for journals including: <i>Nature Communications</i> , <i>iScience</i> (Cell Press), <i>ACS Synthetic Biology</i> , <i>Journal of Virology</i> , <i>mSystems</i> , <i>Journal of Proteome Research</i> , <i>Genome Biology and Evolution</i> , <i>Virology Journal</i> (BMC), <i>PeerJ</i> , <i>PLOS ONE</i>	Present
Thesis examiner (2 PhD theses)	Present
Grant review for agencies including: NSERC, BBSRC, and SGCL	Present
ASM Bacteriophage Biology & Therapeutics Special Interest Group	2020-2023

Australian Society for Microbiology (ASM) Member	2018-Present
Australian Society for Biochemistry & Molecular Biology (ASBMB) Member	2019
Synthetic Biology Australasia Society Member	2018-2021
MQ Molecular Sciences Department Hiring Panel - Academic Personnel	2018-2020
Macquarie University PGRF Grant Evaluation Panel	2018/2020
Synthetic Biology Australasia 2017 Conference Organiser	2018
Elected graduate student representative to Microbiology Department faculty meetings	2005-2010

TEACHING EXPERIENCE

MOLS8411: Molecular Genomics Analysis and Design	2020-Present
Unit Convenor, Curriculum Designer, and Instructor	
Masters of Biotechnology course	
Macquarie University, Sydney	

MOLS7911: Laboratory Skills for Molecular Science Research	2017-Present
Instructor for synthetic biology computational lab skills component	
Masters level lecture and computer workshop course	
Macquarie University, Sydney	

BMOL3201: Advanced Biochemistry & Cell Biology	2016-Present
Unit Convenor and Instructor	
Final year undergraduate level lecture and laboratory course	
Macquarie University, Sydney	

CBMS215: Microbiology	2016-Present
Guest Lecturer	
Macquarie University, Sydney	

MOLS7012: Synthetic Biology	2016-Present
Unit Convenor and Instructor	
Masters-level research discussion and lecture course	
Macquarie University, Sydney	

Making a Bacterial Copper Biosensor Workshop	2013
Course Designer and Instructor	
Zamorano Pan-American Agricultural School, Honduras	

Bacteriophage Capture and Release from Yeast	2012
Course Designer and Instructor	
BioCurious, Community Biolab, California, USA	

GFP Expression in E. coli: Make Cells Glow!	2011-2012
Instructor	
BioCurious, Community Biolab, California, USA	

MICB405: Bioinformatics	2005-2008
Teaching Assistant	
University of British Columbia, Canada	

MENTORING AND LEADERSHIP EXPERIENCE

Supervisor of PhD and Masters of Research Students 2016-Present
Guiding and managing graduate student research projects in my synthetic biology group
Successful Completions: 2 PhD and 4 Masters of Research
Macquarie University, Sydney, Australia

Research Experience for Undergraduate (REU) Program 2013 - 2015
Bioengineering Undergraduate Research Project Supervisor
Stanford University, California, USA

San Mateo Biotechnology Career Pathway Internship Program Supervisor 2011 - 2013
High-School Student Research Project Supervisor
Stanford University, California, USA

BioE 44: Synthetic Biology Lab 2011 - 2011
Undergraduate Research Project Supervisor
Stanford University, California, USA

UBC Graduate School Information Events 2010
Incoming Student Mentor
University of British Columbia, Canada

University of British Columbia iGEM Team 2009
Advisor and Lab Manager
University of British Columbia, Canada

MICB 448: Directed Research 2007, 2009-2010
Undergraduate Research Project Supervisor
University of British Columbia, Canada

COMMUNITY ENGAGEMENT

High School Extension Science Course Mentor 2019
Macquarie University in a Day Event Organiser 2019
Macquarie University Open Day Lab Tour Organiser 2018
Pioneering Women in STEM event - Synthetic Biology Activity - Organiser 2017/2018
Learning Education Aspiration Participation (LEAP) Refugee Day Organiser 2017

PRESENTATIONS

Plenary

Jaschke PR. (07/2016). *The future of DNA technology*. Future Scoping the Anthropocene, Genes to Geosciences Outlook Meeting. Macquarie University, Sydney, Australia

Jaschke PR. (04/2016). *Learning How to Engineer Genomes by Building Viruses*. Cutting Edge Symposium on Synthetic Biology, Canberra, Australia

Jaschke PR. (06/2013). *What is synthetic biology, and why is it the field of the future?* Zamorano University Environment Week. Zamorano Pan-American Agricultural School, Honduras (Keynote Plenary Presentation)

Invited

Jaschke PR. (11/2020). *Learning How to Engineer Genomes by Building Viruses*. PHAVES: Phage Directory Virtual Event Series.

Jaschke PR. (10/2019). *Remodelling the genetic code: defining new start codons in E. coli*. Synthetic Biology Australasia 2019 Conference. Brisbane, Australia

Jaschke PR. (04/2018). *Navigating the CSIRO ON Prime experience from Hyperdrive Science's perspective*. ON Prime 5. Sydney, Australia

Jaschke PR. (03/2016). *Learning How to Engineer Genomes by Building Viruses*. University of Technology, Sydney (UTS), Sydney, Australia

Jaschke PR. (12/2014). *Learning How to Engineer Genomes by Building Viruses*. Macquarie University, Sydney, Australia

Jaschke PR. (04/2014). *Learning How to Engineer Genomes by Building Viruses*. Concordia University, Montreal, Canada

Jaschke PR. (10/2013). *Understanding Genomes by Engineering ϕ X174 Phage*. Synthetic Genomics Seminar. Synthetic Genomics Inc. San Diego, CA, USA

Jaschke PR. (09/2012). *Design and construction of a fully decompressed bacteriophage ϕ X174 genome*. University of British Columbia Microbiology and Immunology Seminar Series. Vancouver, BC, Canada

Jaschke PR. (05/2012). *Design and construction of bacteriophage genomes in yeast*. DuPont Genencor Science. Palo Alto, CA, USA

Jaschke PR. (07/2009). *Out of the Blue: a new beginning to the chlorophyll synthesis pathway discovered in a Mg-chelatase mutant*. Stanford University, Stanford, CA, USA

Jaschke PR. (11/2009). *Out of the Blue: the discovery of a new chlorophyll in the purple non-sulfur bacterium Rhodospirillum rubrum*. University of British Columbia Microbiology and Immunology Seminar Series. Vancouver, BC, Canada

Competitively Selected Presentations

Jaschke PR. (2018). *Measuring and modifying translation in Escherichia coli through start codon and orthogonal tRNA engineering*. ComBio2018 Meeting. Sydney, Australia

Jaschke PR. (2013). *Understanding Genomes by Building Viruses*. Stanford Bioengineering Retreat. Santa Cruz, USA

Jaschke PR. (2013). *Engineering synthetic bacteriophage ϕ X174 to understand genomes*. Synthetic Biology 6.0 International Conference. Imperial College London. London, UK

Jaschke PR. (07/2009). *Out of the Blue: characterizing a bchD (Mg-chelatase) mutant producing Zn-bacteriochlorophyll*. 9th International Conference on Tetrapyrrole Photoreceptors of Photosynthetic Organisms. Asilomar Conference Grounds, Pacific Grove, USA

Jaschke PR. (2009). *Investigation of the structure and function of a zinc bacteriochlorophyll photosystem in Rhodospirillum rubrum*. 3rd Life Sciences Institute-Graduate Student Association Conference. University of British Columbia, Vancouver, Canada

- Won Sigma-Aldrich award for best presentation of conference

Jaschke PR. (2008). *Investigation of the structure and function of a zinc bacteriochlorophyll photosystem in Rhodobacter sphaeroides*. 17th Western Photosynthesis Conference. Asilomar Conference Grounds, Pacific Grove, CA, USA

- Won Beverley Green award for outstanding work in photosynthesis research

Jaschke PR. (2003). *The role of calreticulin in cardiomyocyte differentiation*. Canadian Institutes of Health Research and Alberta Heritage Foundation for Medical Research Summer Student Symposium. University of Alberta, Edmonton, Canada

- Won award for outstanding presentation