

Eachan Johnson

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Education

- 2009-14 **Doctor of Philosophy in Chemical Biology**, University of Oxford, UK
Thesis: "Protein-protein recognition in systems exhibiting highly-conserved tertiary structure"
Advisors: Prof Luet Wong, Prof Jane Endicott
- 2005-9 **Master of Chemistry**, University of Oxford, UK
Thesis: "Protein-protein recognition in cytochrome P450 systems"
Advisor: Prof Luet Wong
- Graduated with First Class Honors (equivalent to 4.0/4.0 GPA).

Academic appointments

- 2014– **Postdoctoral Associate**
Infectious Disease and Microbiome Program, Broad Institute, Cambridge, MA, USA
Department of Molecular Biology, Massachusetts General Hospital, Boston, MA, USA
Department of Genetics, Harvard Medical School, Boston, MA, USA

Publication in preparation

Johnson EO, LaVerriere E, Stanley M, Office E, Meyer E, Kawate T, Gomez J, Audette RE, Bandyopadhyay N, Betancourt N, Delano K, Da Silva I, Davis J, Gallo C, Gardner M, Golas A, Guinn KM, Korn R, McConnell JA, Moss CE, Murphy KC, Nietupski R, Papavinasasundaram KG, Pinkham JT, Pino PA, Proulx MK, Ruecker N, Song N, Thompson M, Trujillo C, Wakabayashi S, Wallach JB, Watson C, Ioerger TR, Lander ES, Hubbard BK, Serrano-Wu MH, Ehrst S, Fitzgerald M, Rubin EJ, Sassetti CM, Schnappinger D, Hung DT. Large-scale chemical-genetics yields new *Mycobacterium tuberculosis* inhibitor classes. Preprint: *bioRxiv* 396440, Jan 2019. doi: [10.1101/396440](https://doi.org/10.1101/396440).

- Under review at *Nature*

Refereed articles

1. Bowen AM, **Johnson EO**, Mercuri F, Hoskins NJ, Qiao R, McCullagh JSO, Lovett JE, Bell SG, Zhou W, Timmel CR, Wong LL, Harmer JR. A structural model of a P450-ferredoxin complex from orientation-selective double electron-electron resonance spectroscopy. *Journal of the American Chemical Society*, Feb 2018, 140(7), 2514–2527. PMID: 29266939, doi: [10.1021/jacs.7b11056](https://doi.org/10.1021/jacs.7b11056).
2. **Johnson EO**, Wong LL. Partial fusion of a cytochrome P450 system by carboxy-terminal attachment of putidaredoxin reductase to P450cam (CYP101A1). *Catalysis Science and Technology*, Sep 2016, 6(20), 7549–7560. PMID: 28944003, doi: [10.1039/C6CY01042C](https://doi.org/10.1039/C6CY01042C).
3. Bell SG, McMillan JH, Yorke JA, Kavanagh E, **Johnson EO**, Wong LL. Tailoring an alien ferredoxin to support native-like P450 monooxygenase activity. *Chemical Communications*, Dec 2012, 48(95), 11692–11694. PMID: 23104016, doi: [10.1039/c2cc35968e](https://doi.org/10.1039/c2cc35968e).

- Boehringer J, Riedinger C, Paraskevopoulos K, **Johnson EO**, Lowe ED, Khoudian C, Smith D, Noble ME, Gordon C, Endicott JA. Structural and functional characterization of Rpn12 identifies residues required for Rpn10 proteasome incorporation. *Biochemical Journal*, Nov 2012, 448(1), 55–65. PMID: 22906049, doi: [10.1042/BJ20120542](https://doi.org/10.1042/BJ20120542).
- Bell SG, Yang W, Tan AB, Zhou R, **Johnson EO**, Zhang A, Zhou W, Rao Z, Wong LL. The crystal structures of 4-methoxybenzoate bound CYP199A2 and CYP199A4: structural changes on substrate binding and the identification of an anion binding site. *Dalton Transactions*, Jul 2012, 41(28), 8703–8714. PMID: 22695988, doi: [10.1039/c2dt30783a](https://doi.org/10.1039/c2dt30783a).
- Bell SG, Tan AB, **Johnson EO**, Wong LL. Selective oxidative demethylation of veratric acid to vanillic acid by CYP199A4 from *Rhodopseudomonas palustris* HaA2. *Molecular BioSystems*, Jan 2010, 6(1), 206–214. PMID: 20024082, doi: [10.1039/b913487e](https://doi.org/10.1039/b913487e).
- Bell SG, Xu F, **Johnson EO**, Forward IM, Bartlam M, Rao Z, Wong LL. Protein recognition in ferredoxin-P450 electron transfer in the class I CYP199A2 system from *Rhodopseudomonas palustris*. *Journal of Biological Inorganic Chemistry*, Mar 2010, 15(3), 315–28. PMID: 19904564, doi: [10.1007/s00775-009-0604-7](https://doi.org/10.1007/s00775-009-0604-7).
- Xu F, Bell SG, Peng Y, **Johnson EO**, Bartlam M, Rao Z, Wong LL. Crystal structure of a ferredoxin reductase for the CYP199A2 system from *Rhodopseudomonas palustris*. *Proteins*, Dec 2009, 77(4), 867–880. PMID: 19626710, doi: [10.1002/prot.22510](https://doi.org/10.1002/prot.22510).

Patents pending

- Hung DT, Hubbard B, **Johnson EO**, Kawate T, Serrano-Wu M. Compositions and methods for treating Tuberculosis. Priority Apr 2017. USSN 62/489,143.
- Hung DT, **Johnson EO**, Poulsen B. Multiplex high-resolution detection of micro-organism strains, related kits, diagnostics methods and screening assays. Priority Nov 2015. Published May 2017. WO 2017/079699 A1.

Invited talks

- Mar 2019 “Systems chemical biology for therapeutic discovery”, Worcester Area TB Meeting, University of Massachusetts Medical School, Worcester, MA, USA.
- Nov 2015 “Multiplex target-based screening for *M. tuberculosis* inhibitors”, Boston Area TB Meeting, Harvard TH Chan School of Public Health, Boston, MA, USA.

Conference podium presentations

- Johnson EO, LaVerriere E, Stanley M, Office E, Meyer E, Ehrt S, Rubin EJ, Sassetti CM, Schnappinger D, Hung DT. “Large-scale chemical-genetics yields new classes of inhibitors of *Mycobacterium tuberculosis*”. Gordon Research Conference on Tropical Infectious Diseases (Mar 2019), Galveston, TX, USA.
- Johnson EO, LaVerriere E, Stanley M, Office E, Meyer E, Ehrt S, Rubin EJ, Sassetti CM, Schnappinger D, Hung DT. “Large-scale chemical-genetics yields new classes of inhibitors of *Mycobacterium tuberculosis*”. Keystone Symposium on Phenotypic Drug Discovery (Mar 2019), Breckenridge, CO, USA.
- Johnson EO, LaVerriere E, Stanley M, Office E, Meyer E, Ehrt S, Rubin EJ, Sassetti CM, Schnappinger D, Hung DT. “Large-scale chemical-genetics yields new classes of inhibitors of *Mycobacterium tuberculosis*”. Keystone Symposium on Tuberculosis (Jan 2019), Banff, AB, Canada.

4. Johnson EO, Fitzgerald M, Thompson M, Trujillo C, Pinkham J, Murphy K, Papvinasasundaram K, Ehrh S, Rubin EJ, Sasseti CM, Schnappinger D, Hung DT. "A new platform for anti-tubercular drug discovery". Gordon Research Seminar on Tuberculosis Drug Discovery and Development (Jun 2017), Pisa, Italy.

Conference poster presentations

1. Johnson EO, LaVerriere E, Stanley M, Office E, Meyer E, Ehrh S, Rubin EJ, Sasseti CM, Schnappinger D, Hung DT. "Large-scale chemical-genetics yields new classes of inhibitors of *Mycobacterium tuberculosis*". Keystone Symposium on Phenotypic Drug Discovery (Mar 2019), Breckenridge, CO, USA.
2. Johnson EO, Fitzgerald M, Thompson M, Trujillo C, Pinkham J, Murphy K, Papvinasasundaram K, Ehrh S, Rubin EJ, Sasseti CM, Schnappinger D, Hung DT. "A new platform for anti-tubercular drug discovery". Gordon Research Conference on Tuberculosis Drug Discovery and Development (Jun 2017), Pisa, Italy.
3. Johnson EO, Fitzgerald M, Thompson M, Trujillo C, Pinkham J, Murphy K, Papvinasasundaram K, Ehrh S, Rubin EJ, Sasseti CM, Schnappinger D, Hung DT. "Multiplex drug discovery in *Mycobacterium tuberculosis*". Gordon Research Conference on Tuberculosis Drug Discovery and Development (Jul 2015), Barcelona, Spain.
4. Johnson EO, Bowen AM, Hoskins N, Lovett J, Bell SG, Mercuri F, Harmer JR, Wong, LL, Timmel CR. "Model of a Class I cytochrome P450-ferredoxin complex in frozen solution from DEER". 18th International Conference on Cytochrome P450 (Jun 2013), Seattle, WA, USA.

Departmental talks

- Dec 2017 "Mapping the vulnerabilities of *M. tuberculosis* using high throughput chemical genetics", Broad Institute 12th Annual Retreat, Hynes Convention Center, Boston, MA, USA.
- Oct 2017 "Mapping the vulnerabilities of tuberculosis using chemical genetics", Massachusetts General Hospital Dept of Molecular Biology Retreat, Sea Crest Hotel, Falmouth, MA, USA.
- Jan 2017 "A new platform for anti-tubercular drug discovery", Infectious Disease and Microbiome Program Seminar, Broad Institute, Cambridge, MA, USA.
- Feb 2016 "Multiplex target-based screening for *M. tuberculosis* inhibitors", Massachusetts General Hospital Dept of Molecular Biology, Boston, MA, USA.
- Oct 2015 "Multiplex target-based screening for *M. tuberculosis* inhibitors", Harvard Medical School Dept of Microbiology and Immunobiology, Boston, MA, USA.
- Jun 2011 "Protein-protein interactions during electron transfer in cytochrome P450 systems", University of Oxford Dept of Biochemistry, Oxford, UK.

Awards and funding

- 2018 Future of Science Fund Scholarship, Keystone Symposia.
- 2016-7 BroadNext10 Catalytic Steps Award, Broad Institute, \$75,000.
- 2009-13 Doctoral Training Grant, Biotechnology and Biological Sciences Research Council (UK), \$78,000.
- 2006-9 East Scholarship, University of Oxford.

Teaching

- 2011 Instructor: Group Theory Tutorials (300-level), University of Oxford Dept of Chemistry.
- 2010-1 Instructor: Physical Chemistry (200-level), University of Oxford Dept of Biochemistry.

Teaching development

- 2017 Alan Alda Communication Workshop, Broad Institute.
- 2010 Teaching for Graduate Students, University of Oxford Dept of Biochemistry.

Committees

- 2015– Infectious Disease and Microbiome Program Seminar Series, Broad Institute.
- 2012 Oxford University Biochemical Society, University of Oxford Dept of Biochemistry.

Mentoring

- 2017– Emma Office, Research Associate, Broad Institute.
- Now applying to medical school.
 - Winner of Best Poster, BroadRATS Poster Session 2018.
- 2017 Joyce Kang, Rotating Graduate Student, Broad Institute.
- 2016– Sofia Kennedy, Undergraduate, Broad Institute.
- Now applying to medical school.
 - Won a Harvard Program for Research in Science and Engineering Fellowship in 2017.
- 2016 Erica Zhang, Rotating Graduate Student, Broad Institute.
- 2015-7 Elisabeth Meyer, Research Associate, Broad Institute.
- Now a graduate student at Stanford University.
- 2014 Jon Edelstein, Research Associate, Broad Institute.
- Now attending medical school at Temple University.
- 2014 Matthew Thompson, Research Associate, Broad Institute.
- Now an automation specialist at Caribou Biosciences.
- 2012 Sophia Cheng, Undergraduate, University of Oxford.
- Now in financial services.

Professional memberships

American Association for the Advancement of Science
American Society for Biochemistry and Molecular Biology
American Society for Microbiology