

Michael C. Puljung, Ph.D.

DEPARTMENT OF CHEMISTRY AND THE NEUROSCIENCE PROGRAM
CLEMENT CHEMISTRY BUILDING, TRINITY COLLEGE
300 SUMMIT ST., HARTFORD, CT 06106
MICHAEL.PULJUNG@TRINCOLL.EDU

EDUCATION

- 2005 Ph.D. Dept. of Neurobiology, Pharmacology & Physiology, University of Chicago, Chicago, IL
1998 B.S. Biochemistry, Benedictine University, Lisle, IL

PROFESSIONAL POSITIONS

- 2020-present *Assistant Professor*, Department of Chemistry and Neuroscience Program
Trinity College, Hartford, CT
- 2013-2020 *Departmental Research Lecturer*, Department of Physiology, Anatomy & Genetics
University of Oxford, Oxford, UK
Mentor: Frances Ashcroft, Ph.D., DBE, FRS, FMedSci
Focus: *Metabolic regulation and dynamics of K_{ATP} ion channels*
- 2005-2013 *Research Scientist*, Department of Physiology & Biophysics
University of Washington, Seattle, WA
Mentor: William Zagotta, Ph.D.
Focus: *Novel techniques for structural analysis of HCN channel gating*
- 1998-2005 *Doctoral Student*, Department of Neurobiology, Pharmacology & Physiology
The University of Chicago, Chicago, IL
Mentor: Dorothy Hanck, Ph.D.
Thesis: *An Ionic Block Model of Voltage Gating in Gap Junction Hemichannels*
- 1996-1998 *Research Assistant*, Department of Chemistry
Benedictine University, Lisle, IL
Mentor: David Rausch, Ph.D.
Thesis: *Synthesis of precursor molecules for polymerization catalysts*

CURRENT RESEARCH FUNDING

- 2018-2021 BBSRC (UK) Responsive mode research grant BB/R002517/1—researcher co-investigator, £554,730 (\$677,880 USD)
- 2017 John Fell Fund—Oxford University Press, £7500 (\$9,165.00 USD)
- 2017 Horne Family Foundation Donation, \$5000 CAD (\$3,750 USD)

PREVIOUS GRANTS AND RESEARCH SUPPORT

- 2008-2010 National Research Service Award, NEI (F32EY018981), \$104,632
- 2001-2003 National Research Service Award, NINDS (F31NS042972), \$89,346
- 1998-2001 Training grant, NIDA (DA07255)

GRADUATE TRAINEES

- 2017-present Samuel Usher, D.Phil. student OXION Programme

TEACHING EXPERIENCE

- 2018-present *Final Honour School Tutorials*—The Queen's College, University of Oxford
- 2018-present *Organizer*—Ion channels and Physiology Journal Club, University of Oxford
- 2016-present *Supervisor for graduate and undergraduate researchers*, University of Oxford
- 2011-2012 *Supervisor for undergraduate research*, University of Washington
- 2009 *Guest Lectures*, University of Washington, *NBio402 Neuropathophysiology*
- 2006-2013 *Guest Lectures*, University of Washington, *PBio519 Membrane and Muscle Biophysics Seminars*
- 2000-2003 *Teaching assistant*, The University of Chicago, *Cellular Neurobiology*.

- 2001 Laboratory instructor, review sessions, grading.
Teaching assistant, The University of Chicago, *Neuropsychopharmacology*.
Lectures, review sessions, grading.
- 1996-1997 *Teaching assistant*, Benedictine University, *Organic Chemistry Laboratory*,
Biochemistry Laboratory, *Qualitative Organic Analysis*. Lab instructor, grading.

HONORS AND AWARDS

- 2018 JGP travel award—Ion Channels Gordon Research Conference
- 2018 Oxford Interdisciplinary Bioscience Impact Award—Science Communication
- 2018 Citation for Distinguished Service—most manuscripts reviewed by a postdoc in
2017, *The Journal of General Physiology*
- 2005 Harry Ginsberg Memorial Prize for Outstanding Performance in the General
Field of Physiology (The University of Chicago)
- 2004 Biophysical Society Student Research Achievement Award
- 2003 International Gap Junction Conference Student Travel Award
- 1997 Gregory Snoke Scholarship (Benedictine University)
- 1994-1998 University Scholar (Benedictine University)

PUBLIC LECTURES

- 2020 *Invited Lecture*: Ligand Recognition and Molecular Gating Gordon Research
Conference (canceled due to COVID-19 outbreak)
- 2020 *Platform talk*: Biophysical Society Meeting
- 2019 *Invited Lecture*: Trinity College, Connecticut. Departments of Neuroscience and
Chemistry
- 2019 *Invited Lecture*: Integrative Physiology, Cardiovascular & Metabolism Theme
Day, University of Oxford
- 2018 *Invited Lecture* 29th Annual Association Canaux Ioniques meeting
- 2018 *Invited Lecture*: 2018 Ion Channels Gordon Research Seminar
- 2017 *Invited Lecture*: 15th Annual Oxion Symposium, University of Oxford
- 2016 *Invited Lecture*: Department of Physiology, University of Maryland
- 2015 *Invited Lecture*: Department of Cellular and Molecular Physiology, Loyola
University Chicago
- 2012 *Invited Lecture*: H.D. Patton Symposium, University of Washington
- 2012 *Platform talk*: Biophysical Society Meeting
- 2003 *Invited Lecture*: American Society for Cell Biology, Gap Junction Subgroup
- 2002 *Invited Lecture*: University of Chicago Neurobiology, Pharmacology &
Physiology Retreat

PROFESSIONAL SERVICE/ASSOCIATIONS

- Referee Agence Nationale de la Recherche (France)
- Referee *Biochemistry*, *British Journal of Pharmacology*, *eLife*, *Frontiers in
Pharmacology*, *General Physiology and Biophysics*, *The Journal of General
Physiology*, *Nature Communications*, *Proceedings of the National Academy of
Sciences (USA)*, *Scientific Reports*
- Service *Journal of General Physiology* Diversity and Inclusion Working Group
- Service Postdoctoral representative to *The Journal of General Physiology* Membrane
Protein Structure and Dynamics Focus Group
- Outreach Scientific advice/consultation with Motionhouse Dance Theatre Company on
their show “Charge” and associated educational materials
<https://charge.motionhouse.co.uk/science/extra-content/>
- Outreach *Journal of General Physiology* Twitter takeover, Biophysical Society 2019
- Member Biophysical Society (2004-present)
- Member Association Canaux Ioniques (2018-present)

PUBLICATIONS (ORCID <https://orcid.org/0000-0002-9335-0936>)

Usher SG, Ashcroft FM, and **Puljung MC**. (2020) Nucleotide inhibition of the pancreatic ATP-sensitive K⁺ channel explored with patch-clamp fluorometry. *eLife*. 9:e52775. doi: 10.7554/eLife.52775. <https://elifesciences.org/articles/52775>

Puljung M, Vedovato N, Usher S, and Ashcroft F. (2019) Activation mechanism of ATP-sensitive K⁺ channels explored with real-time nucleotide binding. *eLife*. 8. pii: e41103. doi: 10.7554/eLife.41103. <https://elifesciences.org/articles/41103>

Puljung MC. (2018) Cryo-electron microscopy structures and progress toward a dynamic understanding of K_{ATP} channels. *J Gen Physiol*. 150:653-669. review <http://jgp.rupress.org/content/150/5/653.long>

Ashcroft FM, **Puljung MC**, and Vedovato N. (2017) Neonatal Diabetes and the K_{ATP} Channel: From Mutation to Therapy. *Trends Endocrinol Metab*. 28(5):377-387. review <https://www.sciencedirect.com/science/article/pii/S104327601730019X?via%3Dihub>

Proks P, **Puljung MC**, Vedovato N, Sachse G, Mulvaney R, Ashcroft FM. (2016) Running out of time: the decline of channel activity and nucleotide activation in adenosine triphosphate-sensitive K-channels. *Philos Trans R Soc London B Biol Sci*. 371(1700). pii: 20150426. review <http://rstb.royalsocietypublishing.org/content/371/1700/20150426.long>

Vedovato, N, Ashcroft FM, and **Puljung MC**. (2015) The nucleotide-binding sites of SUR1: a mechanistic model. *Biophys J*. 109:2452-60. review <https://www.sciencedirect.com/science/article/pii/S0006349515011005?via%3Dihub>

Puljung MC. (2015) New structural insights into the gating movements of CFTR. *J Gen Physiol*. 145:365-9. commentary <http://jgp.rupress.org/content/145/5/365.long>

Puljung MC. (2014) Dynamic measurements for funny channels. *Proc Natl Acad Sci USA*. 111:14320-1. commentary <http://www.pnas.org/content/111/40/14320.long>

Puljung MC*, DeBerg HA*, Zagotta WN, and Stoll S. (2014) Double electron-electron resonance reveals cAMP-induced conformational change in HCN channels. *Proc Natl Acad Sci USA*. 111:9816-21. *These authors contributed equally to this work. <http://www.pnas.org/content/111/27/9816.long>

Puljung MC and Zagotta WN. (2013) A secondary structural transition in the C helix promotes gating of cyclic nucleotide-regulated ion channels. *J Biol Chem*. 288:1294-56. <http://www.jbc.org/content/288/18/12944.long>

Puljung MC and Zagotta WN. (2012) Fluorescent labeling of specific cysteine residues using CyMPL. *Curr Protoc Protein Sci*. Nov; Chapter 14:Unit14.14. doi: 10.1002/0471140864.ps1414s70. <https://currentprotocols.onlinelibrary.wiley.com/doi/abs/10.1002/0471140864.ps1414s70>

Puljung MC and Zagotta WN. (2011) Labeling of specific cysteines in proteins using reversible metal protection. *Biophys J*. 100:2513-2521. <https://www.sciencedirect.com/science/article/pii/S0006349511004668?via%3Dihub>

Taraska JW*, **Puljung MC***, and Zagotta WN. (2009) Short-distance probes for protein backbone structure based on energy transfer between bimane and transition metal ions. *Proc Natl Acad Sci USA*. 106:16227-32. *These authors contributed equally to this work. <http://www.pnas.org/content/106/38/16227.long>

Taraska JW, **Puljung MC**, Olivier NB, Flynn GE, and Zagotta WN. (2009) Mapping the structure and conformational movements of proteins with transition metal ion FRET. *Nat Methods*. 6:532-7. <https://www.nature.com/articles/nmeth.1341>

Puljung MC, Berthoud VM, Beyer EC, and Hanck DA. (2004) Polyvalent cations constitute the voltage gating particle in human connexin37 hemichannels. *J Gen Physiol*. 124:587-603. <http://jgp.rupress.org/content/124/5/587.long>

McNulty M, **Puljung M**, Jefford G, and Dubreuil RR. (2001) Evidence that a copper-metallothionein complex is responsible for fluorescence in acid-secreting cells of the *Drosophila* stomach. *Cell Tissue Res*. 304:383-389. <https://link.springer.com/article/10.1007/s004410100371>

RECENT ABSTRACTS

Usher S, Ashcroft FM, and **Puljung MC**. Patch-clamp fluorometry defines a role for SUR1 in nucleotide inhibition of K_{ATP} channels. Biophysical Society 63rd Annual Meeting (2020)

Puljung MC, Usher S, Vedovato N, Ashcroft FM. Nucleotide modulation of K_{ATP} channels disentangled with FRET. Biophysical Society 63rd Annual Meeting (2019)

Puljung MC, Usher S, Vedovato N, Ashcroft FM. Using FRET to Disentangle Nucleotide Binding Effects on K_{ATP} . Ion Channels Gordon Research Conference (2018)

Usher S, **Puljung MC**, Vedovato N, Ashcroft FM. Visualising adenine nucleotide regulation of the K_{ATP} channel. Biophysical Society 62nd Annual Meeting (2018)

Puljung MC, Vedovato N, Ashcroft FM. A Novel, Spectroscopic Window into Nucleotide Activation of K_{ATP} Channels. Biophysical Society 61st Annual Meeting (2017)