

## Julie McDonald

Cambridge, MA - jlmcd@mit.edu - [juliemcdonald.com](http://juliemcdonald.com)

### EDUCATION

**Massachusetts Institute of Technology**, Cambridge, MA September 2020 – August 2025  
PhD Candidate, Department of Biology  
Fellow, *MIT Martin Family Society of Fellows for Sustainability*  
**Wesleyan University**, Middletown, CT September 2014 – May 2018  
Bachelor of Arts, High Honors, Molecular Biology & Biochemistry

### RESEARCH EXPERIENCE

**Massachusetts Institute of Technology**, Cambridge, MA June 2022 – Present  
Graduate Student, MIT Biology; **Advisor:** Prof. Matthew Shoulders  
Thesis: *Engineering Biological CO<sub>2</sub> Fixation Using Directed Evolution and Machine Learning*  
**Whitehead Institute**, Cambridge, MA May 2021 – June 2022  
Graduate Student, MIT Biology; **Advisor:** Prof. Jing-Ke Weng  
**Massachusetts General Hospital**, Boston, MA July 2018 – July 2020  
Research Technician, Dept. of Molecular Biology; **Advisor:** Prof. Luke Chao  
**Wesleyan University**, Middletown, CT May 2017 – May 2018  
Research Assistant, Dept. of Molecular Biology & Biochemistry; **Advisor:** Prof. Ishita Mukerji

### SELECT PUBLICATIONS & PRESENTATIONS

1. **McDonald, J. L.**, et al. (2025). *In vivo* directed evolution of a natural, ultra-fast RuBisCO from a semi-anaerobic environment innovates on oxygen sensitivity. *BioRxiv*.
2. **McDonald, J. L.**, & Wilson, R. H. (2025). New molecular chaperone roles for CO<sub>2</sub> assimilation in early land plants. *Mol. Plant*.
3. Mengiste, A. A., **McDonald, J. L.**, et al. (2024). MutaT7<sup>GDE</sup>: A Single chimera for the targeted, balanced, efficient, and processive installation of all possible transition mutations *in vivo*. *ACS Synth. Biol.*, 13(9), 2693-2701.
4. Boopathy, S., Luce, B. E., Lugo, C. M., Hakim, P., **McDonald, J.L.**, Kim, H. L., ... & Chao, L. H. (2024). Identification of SLC25A46 interaction interfaces with mitochondrial membrane fusogens Opa1 and Mfn2. *J. Biol. Chem.*, 300(10).
5. **Invited seminar:** Technology for Continuous Directed Evolution of RuBisCO, *Australian National University Plant Biol. Seminar Series* (2023). Host: Prof. Spencer Whitney
6. Ge, Y., Shi, X., Boopathy, S., **McDonald, J. L.**, Smith, A. W., & Chao, L. H. (2020). Two forms of Opa1 cooperate to complete fusion of the mitochondrial inner-membrane. *eLife*, 9, e50973.

### TEACHING, OUTREACH, & MENTORSHIP

**Teaching assistant** September 2021 – Present  
*Pedagogy Program Certificate*  
*Teaching Assistant; Fundamentals of Chemical Biology, Introductory Biology*  
Genes in Space Program **Mentor** March 2024 – Present  
MIT Undergraduate Research Opportunities Program (UROP) **Mentor** June 2023 – Present  
Biology Application Assistance Program (BAAP) **Mentor** June 2022 – Present  
Whitehead Institute HS Teacher's Program **Mentor** August 2021 – August 2022  
Expedition:Bio, Whitehead Institute **Mentor** August 2021 – August 2022