

# Rohan Maddamsetti

Center for Quantitative Biodesign at Duke University  
Fitzpatrick Center 1345, 101 Science Drive, Durham NC, 27705

Email: (preferred) [rohan.maddamsetti@gmail.com](mailto:rohan.maddamsetti@gmail.com)

(institutional): [rohan.maddamsetti@duke.edu](mailto:rohan.maddamsetti@duke.edu)

## EMPLOYMENT

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**Rutgers University–New Brunswick**, New Brunswick, NJ

Assistant Professor (2025– ), Department of Biochemistry and Microbiology, School of Environmental and Biological Sciences

**Duke University**, Durham, NC

Postdoctoral Research Fellow (2020–2024), Center for Quantitative Biodesign, advised by Prof. Lingchong You

**Old Dominion University**, Norfolk, VA

Visiting Assistant Professor (2018–2020), Department of Biological Sciences

**Harvard Medical School**, Boston, MA

Postdoctoral Research Fellow (2016–2018), Department of Systems Biology, advised by Prof. Debora Marks

**Indiana University**, Bloomington IN

Research Associate (2009), in Prof. Michael Lynch's evolutionary genetics lab.

## EDUCATION

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**Michigan State University**, East Lansing MI

PhD (2016), Evolution, Ecology and Behavioral Biology, Department of Integrative Biology, advised by Dr. Richard Lenski

**Brown University**, Providence RI

Sc.B (2008) with Honors in Computational Biology, advised by Dr. Daniel Weinreich

## PREPRINTS AND WORKING PAPERS

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**Maddamsetti R**, Wilson ML, Son HI, Zhou Z, Lu J, You L. Scaling laws of plasmids across the microbial tree of life. <https://doi.org/10.1101/2024.10.04.616653> In review at *Nature*

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*Communications.*

**Maddamsetti R**, You L. Circular RNA Obelisk-*S.s* is highly abundant in *Streptococcus sanguinis* SK36. *bioRxiv*. <https://doi.org/10.1101/2024.03.24.586467>. In review at *RNA*.

Lu J, Luo N, Liu S, Sahu K, **Maddamsetti R**, Baig Y, You L. Discovery of interpretable patterning rules by integrating mechanistic modeling and deep learning. <https://doi.org/10.1101/2024.09.02.610872> In review at *Nature Chemical Biology*.

## PEER-REVIEWED PUBLICATIONS

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Hamrick G, **Maddamsetti R**, Son H, Wilson M, Davis H, You L. Programming dynamic division of labor using horizontal gene transfer. *ACS Syn. Bio.* <https://doi.org/10.1021.acssynbio.3c00615>

**Maddamsetti R**, Yao Y, Wang T, Gao J, Huang V, Hamrick G, Son H, You L. 2024. Duplicated antibiotic resistance genes reveal ongoing selection and horizontal gene transfer in bacteria. *Nature Communications*. <https://doi.org/10.1038/s41467-024-45638-9>

Benham S, Dutta S, **Maddamsetti R**, Wright C, Anderson A, Gauthier D, Gaff H. 2024. Contrasting tick species behaviors: A course-based undergraduate research experience (CURE). *SPORA: A Journal of Biomathematics*. <https://doi.org/10.61403/2473-5493.1081>

**Maddamsetti R\***, Grant N\*. 2022. Discovery of positive and purifying selection in metagenomic time series of hypermutator microbial populations. *PLOS Genetics*. <https://doi.org/10.1371/journal.pgen.1010324>.

**Maddamsetti R**. Idiosyncratic purifying selection on metabolic enzymes in the long-term evolution experiment with *Escherichia coli*. 2022. *Genome Biology and Evolution*. <https://doi.org/10.1093/gbe/evac114>

Yao Y, **Maddamsetti R**, Weiss A, Ha Y, Wang T, Wang S, You L. Intra- and interpopulation transposition of mobile genetic elements driven by antibiotic selection. 2022. *Nature Ecology & Evolution*. <https://doi.org/10.1038/s41559-022-01705-2>

**Maddamsetti R**. Selection maintains protein interactome resilience in the long-term evolution experiment with *Escherichia coli*. 2021. *Genome Biology and Evolution*. <https://doi.org/10.1093/gbe/evab074>

**Maddamsetti R**. Universal constraints on protein evolution in the long-term evolution experiment with *Escherichia coli*. 2021. *Genome Biology and Evolution*. <https://doi.org/10.1093/gbe/evab070>

Grant N, **Maddamsetti R**, Lenski RE. 2021. Maintenance of metabolic plasticity despite relaxed selection in a long-term evolution experiment with *Escherichia coli*. *The American Naturalist*. <https://doi.org/10.1086/714530>

Green AG, Elhabashy H, Brock KP, **Maddamsetti R**, Kohlbacher O, Marks DS. 2021. Large-scale discovery of protein interactions at residue resolution using co-evolution calculated from genomic sequences. *Nature Communications*. **12**: 1–12.

**Maddamsetti R**, Grant N. 2020. Divergent evolution of mutation rates and biases in the long-term evolution experiment with *Escherichia coli*. *Genome Biology and Evolution*. **12**: 1591–1603.

Blount ZD\*, **Maddamsetti R\***, Grant N\*, Ahmed ST, Jagdish T, Sommerfeld BA, Tillman A, Moore J, Slonczewski JL, Barrick JE, Lenski RE. 2020. Genomic and phenotypic evolution of *Escherichia coli* in a novel citrate-only resource environment. *eLife*. **9**: e55414.

Schubert B\*, **Maddamsetti R\***, Nyman J, Farhat MR, Marks DS. 2019. Genome-wide discovery of epistatic loci affecting antibiotic resistance in *Neisseria gonorrhoeae* using evolutionary couplings. *Nature Microbiology*. **4**: 328–338.

**Maddamsetti R**, Johnson DT, Spielman SJ, Petrie KL, Marks DS, Meyer JR. 2018. Gain-of-function experiments with bacteriophage lambda uncover residues under diversifying selection in nature. *Evolution*. **72**: 2234–2243.

**Maddamsetti R**, Lenski RE. 2018. Analysis of bacterial genomes from an evolution experiment with horizontal gene transfer shows that recombination can sometimes overwhelm selection. *PLOS Genetics*. **14**: e1007199.

**Maddamsetti R**, Hatcher PJ, Green A, Williams BJ, Marks DS, Lenski RE. 2017. Conserved core genes evolve rapidly in a long-term experiment with *Escherichia coli*. *Genome Biology and Evolution* doi: 10.1093/gbe/evx064.

**Maddamsetti R**. Gene flow in microbial communities could explain unexpected patterns of synonymous variation in the *Escherichia coli* core genome. 2016. *Mobile Genetics Elements*. **6**: e1137380.

Stapleton JA, Kim J, Hamilton JP, Wu M, Irber LC, **Maddamsetti R**, Briney B, Newton L, Burton DR, Brown CT et al. 2016. Haplotype-phase synthetic long reads from short-read sequencing. *PLOS One*. **11**: e0147229.

Lenski RE, Wisner MJ, Ribeck N, Blount ZD, Nahum JR, Morris JJ, Zaman L, Turner CB, Wade BD,

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**Maddamsetti R** et al. 2015. Sustained fitness gains and variability in fitness trajectories in the long-term evolution experiment with *Escherichia coli*. *Proceedings of the Royal Society B* **282**: 20152292.

**Maddamsetti R**, Hatcher PJ, Cruveiller S, Médigue C, Barrick JE, Lenski RE. 2015. Synonymous genetic variation in natural isolates of *Escherichia coli* does not predict where synonymous substitutions occur in a long-term experiment. *Molecular Biology and Evolution* **32**: 2897–2904.

**Maddamsetti R**, Lenski RE, Barrick JE. 2015. Adaptation, clonal interference, and frequency-dependent interactions in a long-term evolution experiment with *Escherichia coli*. *Genetics* **200**: 619–631.

Lucas-Lledó JI, **Maddamsetti R**, Lynch M. 2011. Phylogenomic analysis of the uracil-DNA glycosylase superfamily. *Molecular Biology and Evolution* **28**: 1307–1317.

Rinaudo, K., Bleris, L., **Maddamsetti, R.**, Subramanian, S., Weiss, R., & Benenson, K. 2007. A universal RNAi-based logic evaluator that operates in mammalian cells. *Nature Biotechnology* **25**: 795–801.

\*Equal contribution

## TALKS

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**Invited Speaker**, Department of Microbiology and Biochemistry, Rutgers University–New Brunswick, 2024, New Brunswick NJ

**Invited Speaker**, Gordon Research Seminar on Microbial Population Biology, 2023, Andover NH

**Invited Speaker**, South Texas Center for Emerging Infectious Diseases Seminar, University of Texas at San Antonio, 2022, San Antonio TX.

**Invited Speaker**, Departmental Seminar, Trinity University, 2022, San Antonio TX.

**Invited Speaker**, EEBio Seminar, University of Virginia, 2020, Charlottesville VA.

**Invited Speaker**, Departmental Seminar, Old Dominion University 2019, Norfolk VA.

**Invited Speaker**, BioMath Seminar, College of William and Mary, 2019.

**Speaker**, Southeastern Population Ecology and Evolutionary Genetics (SEPEEG) conference 2018.

**Invited Speaker**, Special Seminar, Old Dominion University 2018, Norfolk VA.

**Invited Speaker**, W.D. Hamilton symposium, Society for the Study of Evolution 2016, Austin TX.

**Speaker**, Gordon Research Seminar on Microbial Population Biology 2015, Andover NH

**Speaker**, Society for the Study of Evolution 2014, Raleigh, NC, 6/20/2014.

**Speaker**, 2013 Environmental Science and Policy Program Research Symposium 2013, Michigan State University, East Lansing, MI

**Speaker**, BEACON Center for the Study of Evolution in Action, Michigan State University, East Lansing, MI, 10/4/2013.

## **AWARDS, FELLOWSHIPS, GRANTS**

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**NIH NIGMS Award Supplement, July 2023:** \$78,382.62 award for purchase of Illumina MiniSeq.

**Duke Microbiome Center Voucher grant, December 2021: “Mobile genetic elements promote specific evolutionary paths to high-level tetracycline resistance”:** \$10,000 award for whole-genome sequencing.

**Duke University Compact for Open Access Publishing Equity (COPE) Grant:** \$2000 award to cover page charges in PLOS Genetics for “Discovery of positive and purifying selection in metagenomic time series of hypermutator microbial populations”.

**ODU CURE grant, May 2019: “Active learning of bioinformatics algorithms through coding and research”:** \$2000 award for undergraduate research-based course development.

**Finalist for W.D. Hamilton Award 2016: Invited talk in W.D. Hamilton Award symposium at Evolution 2016:** \$500 travel award from the Society for the Study of Evolution.

**2016 Centennial Award for outstanding Population & Evolutionary Genetics article published in *Genetics*:** for article “Adaptation, Clonal Interference, and Frequency-Dependent Interactions in a Long-Term Evolution Experiment with *Escherichia coli*”

**MSU College of Natural Sciences Dissertation Completion Fellowship 2016:** PhD support during final semester

**NSF BEACON grant “Studying recombination in evolution experiments with long-read genome sequencing technologies” 2015:** research funds, travel funds, and five months of PhD support

**MSU College of Natural Sciences Dissertation Continuation Fellowship 2015:** one summer of PhD support

**MSU EEBB Summer Travel Fellowships 2011-2015:** travel funds to present research at conferences

**National Defense Science and Engineering Graduate Fellowship 2011:** three years of PhD support

**MSU Distinguished University Fellowship 2009:** two years of PhD support

**National Merit Scholar 2004**

**TEACHING**

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**Research Mentor, You Lab, Duke University**

2020–: Mentored one graduate student and two undergraduates on three separate research projects.

**Visiting Assistant Professor, Old Dominion University**

**BIOL 451/551 Bioinformatics and Genomics**

Fall 2019: Designed and taught a research-based undergraduate seminar on bioinformatics and genomics.

**Visiting Assistant Professor, Old Dominion University**

**BIOL 123N/124N Biology I/II Lecture**

Fall 2018-Spring 2020: taught first-year Biology to 40-90 students per semester.

**Visiting Assistant Professor, Old Dominion University**

**BIOL 121N/122N Biology I/II Lab**

Fall 2018-Spring 2019: taught laboratory sections of Introductory Biology to 30-60 students per semester.

**Research Mentor, Lenski Lab**

2010-2012: Mentored an undergraduate (currently postdoc at Stanford after PhD at Columbia University) in a genetic engineering research project.

**Program in Undergraduate Research Learning**

2010-2011: Mentored three undergraduates in computational research over three semesters.

**Teaching Assistant, Michigan State University**

ISB208L Applications in Biological Science Laboratory, Spring 2011

**Teaching Assistant, Michigan State University**

ZOL320 Developmental Biology, Fall 2010

**Teaching Assistant, Brown University**

CSCI0196 Algorithmic Foundations of Computational Biology, Spring 2008

**SERVICE**

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**Professional societies:** Society for Molecular Biology and Evolution (lifetime member)

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AUGUST 2024

2022-2023 committee work on SBE IDEA (Inclusion, Diversity, Equity and Access) Initiative

**Biomedical Engineering, Duke University:** Diversity, Equity, and Inclusion Committee 2024-2025

**Ad-hoc reviewer for:** *Nature Ecology & Evolution, Nature Communications, eLife, PLOS Biology, PLOS Genetics, Genetics, Genome Research, Genome Biology and Evolution, Entropy, Genes, Journal of Theoretical Biology, Heredity, Bioinformatics, ACS Synthetic Biology, ACS Omega*

## REFERENCES

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Prof. Lingchong You

Duke University

[you@duke.edu](mailto:you@duke.edu)

919-660-8408

Prof. Debora Marks

Harvard Medical School

[debbie@hms.harvard.edu](mailto:debbie@hms.harvard.edu)

[jake\\_reardon@hms.harvard.edu](mailto:jake_reardon@hms.harvard.edu) (Lab Manager)

(617) 432-4996 (Faculty Assistant, Jennie Epp)

Prof. Richard Lenski

Michigan State University

[lenski@msu.edu](mailto:lenski@msu.edu)

517-884-5397

Prof. C. Titus Brown

University of California, Davis

[ctbrown@ucdavis.edu](mailto:ctbrown@ucdavis.edu)

Prof. Barry Williams

College of Southern Nevada

[barrywilliamsphd@gmail.com](mailto:barrywilliamsphd@gmail.com)

Prof. Chris Osgood (Reference for teaching experience and capabilities)

Old Dominion University

[cosgood@odu.edu](mailto:cosgood@odu.edu)

757-683-3595