Ryan A. Melnyk, Ph.D.
University of California, Davis
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EDUCATION

2009-2014 **University of California, Berkeley**
Ph.D. in Microbiology

2005-2009 **University of Pittsburgh**
B.S. in Microbiology with Honors

POSITIONS HELD

5/2018-present Postdoctoral Fellow, **University of California, Davis**
Department of Plant Sciences
Pathogenesis and physiology of bacterial populations in the rice microbiome
Advisor: Dr. Venkatesan Sundaresan (co-advised by Dr. Cara Haney)

8/2016–4/2018 Postdoctoral Fellow, **University of British Columbia**
Department of Microbiology and Immunology
Evolutionary genomics of plant-associated bacterial lifestyles
Advisor: Dr. Cara Haney

10/2015–7/2016 Computational Graduate Scholar, **Bayer CropScience**
Research and Development, Biologics Division, West Sacramento, CA
Genomics-guided trait discovery in plant-associated microbes

9/2014–10/2015 Postdoctoral Fellow, **Lawrence Berkeley National Laboratory**
Physical Biosciences Division
Systems biology and synthetic ecology of soil bacteria
Advisor: Dr. Adam Arkin

9/2009-9/2014 Graduate Student Researcher, **University of California, Berkeley**
Department of Plant and Microbial Biology
Genetics and genomics of perchlorate reduction and reactive chlorine species
Advisor: Dr. John Coates

10/2007-6/2009 Undergraduate Researcher, **University of Pittsburgh**
Department of Biology
Tannin resistance in *Pseudomonas* spp. isolated from oak leaves
Advisor: Dr. Brian Traw

PRIMARY AUTHOR PUBLICATIONS

Ryan A. Melnyk, Sarzana S. Hossain, and Cara H. Haney. Convergent gain and loss of genomic islands drives lifestyle changes in plant-associated bacteria. *bioRxiv*. 2018. doi:10.1101/345488

Polina Beskrovnaya#, **Ryan A. Melnyk**#, Yi Song, and Cara H. Haney. Bacterial-produced spermidine promotes growth and suppresses plant defense responses. #Equal contributions. Manuscript in preparation; anticipated submission to Cell Host and Microbe in fall 2018.

Ryan A. Melnyk and John D. Coates. The Perchlorate Reduction Genomic Island: Mechanisms and Pathways of Evolution by Horizontal Gene Transfer. *BMC Genomics*. 2016, 16(1), 862.

Ryan A. Melnyk, Matthew D. Youngblut, Iain C. Clark, Hans K. Carlson, Kelly M. Wetmore, Morgan N. Price, Anthony T. Iavarone, Adam M. Deutschbauer, Adam P. Arkin, and John D. Coates. Novel Mechanism for Scavenging of Hypochlorite Involving a Periplasmic Methionine-Rich Peptide and Methionine Sulfoxide Reductase. *mBio*. 2015, 6(3):e00233-15.

Ryan A. Melnyk, Iain C. Clark, Annette Liao, and John D. Coates. Transposon and deletion mutagenesis of genes involved in perchlorate reduction in *Azospira suillum* PS. *mBio*. 2013, 5(1):e00769-13

Ryan A. Melnyk, Anna Engelbrektson, Iain C. Clark, Hans K. Carlson, Kathy Byrne-Bailey and John D. Coates. Identification of a perchlorate reduction genomic island with novel regulatory and metabolic genes. *Applied and Environmental Microbiology*. 2011, 77(20):7401

INVITED REVIEWS AND COMMENTARIES

Ryan A. Melnyk and Cara H. Haney. Bacterial genomics of plant adaptation. *Nature Genetics*. 2018, 50(1):2-4

Ryan A. Melnyk and Cara H. Haney. Plant Pathology: Plasmid-powered evolutionary transitions. *eLife*. 2017, 6:e33383.

Ryan A. Melnyk and John D. Coates. Microbial fuel cells. *McGraw-Hill Yearbook of Science & Technology*. 2011, pp. 199-202.

Kelly C. Wrighton, Anna E. Engelbrektson, Iain C. Clark, **Ryan A. Melnyk**, and John D. Coates. Accentuate the positive: dissimilatory iron reduction by Gram-positive bacteria. *Microbial Metal and Metalloid Metabolism: Advances and Applications*. 2011, pp. 173-189.

CO-AUTHOR PUBLICATIONS

Morgan N. Price, Kelly M. Wetmore, R. Jordan Waters, Mark Callaghan, Jayashree Ray, Hualan Liu, Jennifer V. Kuehl, **Ryan A. Melnyk**, Jacob S. Lamson, Yumi Suh, Hans K. Carlson, Zuelma Esquivel, Harini Sadeeshkumar, Romy Chakraborty, Grant M. Zane, Benjamin E. Rubin, Judy D. Wall, Axel Visel, James Bristow, Matthew J. Blow, Adam P. Arkin, and Adam M. Deutschbauer. Mutant phenotypes for thousands of bacterial genes of unknown function. *Nature*. 2018, 557:503-509.

Ouwei Wang, **Ryan A. Melnyk**, Misha G. Mehta-Kolte, Matthew D. Youngblut, Hans K. Carlson, and John D. Coates. Functional Redundancy in Perchlorate and Nitrate Electron Transport Chains and Rewiring Respiratory Pathways to Alter Terminal Electron Acceptor Preference. *Front. Microbiol.* 2018, 9:376.

Morgan N. Price, Grant M. Zane, Jennifer V. Kuehl, **Ryan A. Melnyk**, Judy D. Wall, Adam M. Deutschbauer, and Adam P. Arkin. Filling gaps in bacterial amino acid biosynthesis pathways with high-throughput genetics. *PLoS Genetics*. 2018, 14(1):e1007147

Cara H. Haney, Christina L. Wiesmann, Lori R. Shapiro, Lucy R. O'Sullivan, Sophie Khorasani, **Ryan A. Melnyk**, Li Xiao, Jiatong Han, Jenifer Bush, Juli Carrillo, Naomi E. Pierce, and Frederick M. Ausubel. Rhizosphere-associated *Pseudomonas* induce systemic resistance to herbivores at the cost of susceptibility to bacterial pathogens. *Molecular Ecology*. 2018, 27(8):1833-1847

David M. Hershey, Xuefeng Ren, **Ryan A. Melnyk**, Patrick J. Browne, Ertan Ozyamak, Stephanie R. Jones, Michelle C. Y. Chang, James H. Hurley, and Arash Komeili. MamO is a Repurposed Serine Protease that Promotes Magnetite Biomineralization through Direct Transition Metal Binding in Magnetotactic Bacteria. *PLOS Biology*. 2016, 14(3):e1002402.

Iain C. Clark, **Ryan A. Melnyk**, Matthew D. Youngblut, Hans K. Carlson, Anthony T. Iavarone, and John D. Coates. Synthetic and Evolutionary Construction of a Chlorate-Reducing *Shewanella oneidensis* MR-1. *mBio*. 2015, 6(3):e00282-15

Michael P. Thorgersen, W. Andrew Lancaster, Brian J. Vaccaro, Farris L. Poole, Andrea M. Rocha, Tonia Mehlhorn, Angelica Pettenato, Jayashree Ray, R. Jordan Waters, **Ryan A. Melnyk**, Romy Chakraborty, Terry C. Hazen, Adam M. Deutschbauer, Adam P. Arkin, and Michael W. W. Adams. Molybdenum Availability is Key to Nitrate Removal in Contaminated Groundwater Environments. *Applied and Enivronmental Microbiology*. 2015, 81(15), 4976-4983.

Iain C. Clark, **Ryan A. Melnyk**, Anthony T. Iavarone, Pavel S. Novichkov, and John D. Coates. Chlorate reduction in *Shewanella algae* ACDC is a recently acquired metabolism characterized by gene loss, suboptimal regulation and oxidative stress. *Molecular Microbiology*. 2014, 94(1):107-125

Iain C. Clark, **Ryan A. Melnyk**, Anna Engelbrektson, and John D. Coates. Structure and evolution of chlorate reduction composite transposons. *mBio*. 2013, 4(4):e00379-13

Charlotte I. Carlström, Ouwei Wang, **Ryan A. Melnyk**, Stefan Bauer, Joyce Lee, Anna Engelbrektson, and John D. Coates. Physiological and Genetic Description of Dissimilatory Perchlorate Reduction by the Novel Marine Bacterium *Arcobacter* sp. Strain CAB. *mBio*. 2013, 4(3):e00217-13

Hans K. Carlson, Iain C. Clark, **Ryan A. Melnyk**, and John D. Coates. Toward a Mechanistic Understanding of Anaerobic Nitrate-Dependent Iron Oxidation: Balancing Electron Uptake and Detoxification. *Frontiers in Microbiology*. 2012, 3(57):1

Hans K. Carlson, Anthony T. Iavarone, Amita Gorur, Boon Siang Yeo, Rosalie Tran, **Ryan A. Melnyk**, Richard A. Mathies, Manfred Auer, and John D. Coates. Surface multiheme *c*-type cytochromes from *Thermincola potens* and implications for respiratory metal reduction by Gram-positive bacteria. *PNAS*. 2012, 109(5):1702

K. C. Wrighton, J. C. Thrash, **R. A. Melnyk**, J. P. Bigi, K. G. Byrne-Bailey, J. P. Remis, D. Schichnes, M. Auer, C. J. Chang, and J. D. Coates. Evidence for direct electron transfer by a Gram-positive bacterium isolated from a microbial fuel cell. *Applied and Environmental Microbiology*. 2011, 77(21):7633

Kathryne G. Byrne-Bailey, Kelly C. Wrighton, **Ryan A. Melnyk**, Peter Agbo, Terry C. Hazen, and John D. Coates. Complete genome sequence of the electricity-producing *Thermincola potens* strain JR. *Journal of Bacteriology*. 2010, 192(15):4078

HONORS AND AWARDS

Postdoctoral

2017-2020 Simons Foundation Life Sciences Research Fellow, **$186,000**
2017 UBC Postdoc Research Day, 3rd place poster prize

Graduate and Undergraduate

2013-2014 Philomathia Graduate Student Fellowship, **$80,000**
2009-2012 Berkeley Graduate Fellowship, **$40,000**
2009 Departmental Honors in Biology
2008 HHMI Undergraduate Research Fellow, **$3,000**
2005-2009 University of Pittsburgh Honors College Scholarship, **$60,000**

SERVICE

2018 Michael Smith Labs Tour Guide for High School Visits, UBC
2012 Symposium co-chair, UC Berkeley Microbiology Student Group
2010-2011 Treasurer, UC Berkeley Microbiology Student Group

PRESENTATIONS

Talks

2018 Beneficial Microbes Conference (Madison, WI)
2018 Michael Smith Laboratories Departmental Seminar (Vancouver, BC)
2017 Canadian Society of Plant Biologists (Vancouver, BC)
2015 Wageningen-Berkeley Student Workshop (Berkeley, CA)
2013 Energy Biosciences Institute Departmental Seminar (Berkeley, CA)
2012 Plant and Microbial Biology Departmental Seminar (Berkeley, CA)
2012 Plant and Microbial Biology Departmental Retreat (Berkeley, CA)
2011 Microbially Enhanced Hydrocarbon Recovery Retreat Seminar (Walnut Creek, CA)

Posters

2014 International Society for Microbial Ecology (Seoul, Korea)
2013 American Society for Microbiology (Denver, CO)
2013 Energy Bioscience Institute Symposium (Urbana-Champaign, IL)
2012 American Society for Microbiology (San Francisco, CA)
2011 American Society for Microbiology (New Orleans, LA)
2010 American Society for Microbiology (San Diego, CA)

GRANTS

Co-PIs: David Ng, Cara Haney and **Ryan Melnyk** 01/01/2018 - 09/31/2018
Title of Grant: "Whole genome sequencing of *Pseudomonas fluorescens* strains - a high school fieldtrip producing relevant scientific results"
Description of Grant: Michael Smith Labs Director's Kickstart Award, CAD$20,000

PI: **Ryan A. Melnyk** 08/01/2017 - 07/31/2020
Title of Grant: "Characterization of bacterial fitness, niche, and competition in the *Arabidopsis* rhizosphere"
Description of Grant: Simons Foundation Life Sciences Research Fellowship, $186,000

TEACHING EXPERIENCE

2018 Guest Lecturer on Bacterial Genome Evolution
MICB 325 – Bacterial Genetics, UBC

2012 Teaching Assistant
PMB 13 – Genetic Revolutions, UC Berkeley
Instructor: Dr. Michael Freeling

2010-2011 Guest Lecturer on Genomics and Evolution
PMB 116 – Microbial Diversity, UC Berkeley

2010 Teaching Assistant
PMB 116 – Microbial Diversity, UC Berkeley
Instructor: Dr. John Coates

2008 Biology Teaching Assistant/Laboratory Instructor
Pennsylvania Governor's School for the Sciences, Carnegie Mellon University

2007 Chemistry Teaching Assistant/Laboratory Instructor
Pennsylvania Governor's School for the Sciences, Carnegie Mellon University

MENTORING EXPERIENCE

2017 Sarzana Hossain, UBC undergraduate (accepted to M.S. program at University of Toronto)
2015-2016 Rauf Salamzade, Bayer Crop Science (currently at the Broad Institute)
2015 Annie Apffel, UC Berkeley undergraduate (currently at the Broad Institute)
2015 Carlos Preciado Ruiz, UC Berkeley undergraduate
2015 Margaret McNeely, UC Berkeley undergraduate (instructor at UC Berkeley)
2012-2014 Annette Liao, UC Berkeley undergraduate