

Ryan A. Melnyk, Ph.D.

University of British Columbia
420-2125 East Mall
Vancouver, BC Canada V6T 1Z4
717-887-4719 / ryan.melnik@msl.ubc.ca

EDUCATION

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

2005-2009 **University of Pittsburgh** (Pittsburgh, PA)
B.S. in Microbiology with Honors

POSITIONS HELD

8/2016–present **Postdoctoral Fellow**
University of British Columbia (Vancouver, BC, Canada)
Department of Microbiology and Immunology
Evolutionary genomics of bacterial lifestyles and physiology in the rhizosphere
Advisor: Dr. Cara Haney

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

9/2014–10/2015 **Postdoctoral Fellow**
Lawrence Berkeley National Laboratory (Berkeley, CA)
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 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. Plant Pathology: Plasmid-powered evolutionary transitions. *eLife*. 2017, 6:e33383.

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

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

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*. 2017, 00:1-15

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 Environmental 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 *Arvobacter* 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

PREPRINTS

Morgan N. Price, Kelly M. Wetmore, Robert Jordan Waters, Mark Callaghan, Jayashree Ray, Jennifer V. Kuehl, **Ryan A. Melnyk**, Jacob S. Lamson, Yumi Suh, Zuelma Esquivel, Harini Sadeeshkumar, Romy Chakraborty, Benjamin E. Rubin, James Bristow, Matthew J. Blow, Adam P. Arkin, Adam M. Deutschbauer. Deep Annotation of Protein Function across Diverse Bacteria from Mutant Phenotypes. *bioRxiv*. 2016, <http://dx.doi.org/10.1101/072470>

HONORS AND AWARDS

Postdoctoral

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

Graduate and Undergraduate

2013-2014 Philomathia Graduate Student Fellowship
2009-2012 Berkeley Graduate Fellowship
2009 Departmental Honors in Biology
2008 HHMI Undergraduate Research Fellow
2005-2009 University of Pittsburgh Honors College Full Tuition Scholarship

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	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 researcher
2015-2016	Rauf Salamzade, Bayer Crop Science computational biologist (currently at the Broad Institute)

2015	Annie Apffel, UC Berkeley undergraduate researcher (currently at the Broad Institute)
2015	Carlos Preciado Ruiz, UC Berkeley undergraduate researcher
2015	Margaret McNeely, UC Berkeley undergraduate researcher
2012-2014	Annette Liao, UC Berkeley undergraduate researcher