

Dipti Dinkar Nayak

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Education

- ◇ **Harvard University**, Cambridge, MA, USA
Ph.D. in Organismic and Evolutionary Biology
Advisor: Christopher Marx
Sep. 2009—Jun. 2014 (Expected)
- ◇ **Stanford University**, Stanford, CA, USA
M.S. in Environmental Engineering and Science
Advisor: Craig Criddle
Sep. 2007—Jun. 2009
- ◇ **Delhi College of Engineering, Delhi University**, Delhi, India
B.E. in Environmental Engineering
Advisor: S.K. Singh
Aug. 2003—May. 2007

Broad Interests

Experimental Evolution, Microbial Metabolism and Stress Response, Bacterial Genetics and Physiology

Honors and Awards

- ◇ **Organismic and Evolutionary Biology Department Fellowship**, Harvard University, 2009
- ◇ **Graduate School of Arts and Sciences Fellowship**, Harvard University, 2009
- ◇ **John F. P. Braitz Fellowship**, Stanford University, 2007
- ◇ **Civil and Environmental Engineering Dept. Fellowship**, Stanford University, 2007
- ◇ **Delhi College of Engineering Alumni Association Award** for being the **top ranked graduate** in Environmental Engineering, 2007

Research Projects

- ◇ **Experimental Evolution of *Methylobacterium***, Harvard University Sep. 2009—
 - HGT of C₁ metabolic modules on a single genomic background and subsequent evolution to understand the genetic and physiological basis of (in)/compatibility of interacting metabolic modules
 - Experimental evolution of *Methylobacterium* to grow on a toxic single carbon compound to understand the physiological basis of toxic substrate adaptation including underlying stress response mechanisms
 - Genetic basis of cooperative behavior in *Methylobacterium* evolving on toxic single carbon compounds
 - Genetics of and metabolic constraints associated with the N-methyl glutamate pathway
- ◇ **Uranium bioreduction at the Oak Ridge Field Site, TN**, Stanford University Sep. 2007—08
 - Investigated the capacity of two electron acceptors (O₂ and NO₃) to reoxidize microbially reduced Uranium in sediment and water samples from the Oak Ridge Field site.
 - Research published in the Journal of Water Research.
- ◇ **Bioremediation of Petroleum-based Hydrocarbons**, Delhi College of Engineering May. 2006—07
 - Senior Thesis Guide: Prof. S.K. Singh
 - Enriched and isolated microbes that could degrade specific compounds found in petroleum waste.

- Studied the effect of environmental parameters on growth rate of aforementioned microbes.
- Research conducted in conjunction with Indian Oil Corporation Limited, India.

◇ **Decentralized Waste Water Treatment Plants for Small Communities**, JNU, India Summer 2006

- Research Project Guide: Prof. A.L. Ramanathan
- Helped conduct pilot plant studies of a waste water recycling unit.
- Research conducted in conjunction with an NGO: Vigyan Vijay Foundation, New Delhi, India.
- Research presented at the Youth Conference on Water Management, Delhi Sustainable Development Summit 2007.

◇ **Phytoremediation in the Yamuna Biodiversity Park**, Delhi University 2005—06

- Research Project Guide: Faiyyaz Khudsar
- Helped conduct research on the ability of different tropical grasses to reduce alkalinity in soils.

Publications

- ◇ B. Boonchayaanant, **D. Nayak**, D. Xin, C. Criddle, Uranium Reduction and Resistance to Reoxidation under Iron-reducing and Sulfate-reducing Conditions, *Water Research*, Volume 43, Issue 18, pp 4652–4664
- ◇ **D. Nayak**, C. Marx, Genomic and Genetic Analysis of Methylophily in *Methylobacterium extorquens* PA1 — An Emerging Model System for the Study of Aerobic Methylophily, In preparation for *J. Bacteriology*
- ◇ **D. Nayak**, C. Marx, Genetic Analysis of Methylamine Utilization in *Methylobacterium extorquens* PA1 Reveals a Linear N-Methylglutamate Pathway and Potential Roles for FAE Homologs, In preparation for *J. Bacteriology*

Patents

- ◇ Provisional Patent (61/782,141) in the area of using methanol for the biological production of commodity chemicals or biofuels, with Dr. Christopher J. Marx, Filed March 2013

Posters and Talks

- ◇ Invited Talk titled “Using Experimental Evolution to Uncover Novel Metabolic Genes” at NCBS (National Center for Biological Sciences) Bangalore, India in September 2012
- ◇ Contributed Talk titled “Genetic Basis of Aldehyde Resistance in *Methylobacterium*” at the Gordon Research Seminar on Molecular Basis of Microbial One-Carbon Metabolism in Lewiston, Maine August 2012
- ◇ Poster titled “Experimental Evolution of *Methylobacterium* to Grow on Formaldehyde” at the Gordon Research Conference on the Molecular Basis of Microbial One-Carbon Metabolism at Lewiston, Maine in August 2012
- ◇ Invited Talk titled “Hops Resistance in Bacteria” at the MSI Graduate Student Workshop at Harvard University in January 2012
- ◇ Poster titled “Experimental Evolution of *Methylobacterium* to Grow on Formaldehyde” at the Gordon Research Conference on Microbial Population Biology in Andover, NH in July 2011
- ◇ Contributed Talk titled “The Genetic Basis of Resistance to Aldehydes in *Methylobacterium*” at the ASM General Meeting in San Francisco, USA in June 2012
- ◇ Poster titled “Experimental Evolution of *Methylobacterium* to Grow on Formaldehyde” at the Gordon Research Conference on Molecular Basis of Microbial One-Carbon Metabolism in Lewiston, ME in August 2010
- ◇ Poster titled “Experimental Evolution of *Methylobacterium* to Grow on Formaldehyde” at the International Society of Microbial Ecology Meeting in Seattle, WA in August 2010

- Service*
- ◇ **Associate Chair**, Gordon Research Seminar on Molecular Basis of One-Carbon Metabolism, (along with Cornelia Welte), 2014
 - ◇ Nominated Associate Member of Sigma Xi since May 2012
- Awards and Grants*
- ◇ Awarded the MSI (Microbial Sciences Initiative) Travel Grant in 2010
 - ◇ Awarded the ASM (American Society of Microbiology) General Meeting Travel Grant in 2012
 - ◇ Selected for the **Young Investigator Oral Abstract Presentation** at the ASM General Meeting in June 2012
 - ◇ Awarded the **Sigma Xi GIAR** (Grants in Aid-of-Research) for \$1000 in March 2012
- Teaching Experience*
- ◇ Teaching Fellow for a Undergraduate/Graduate level **Statistics for Biology** Course taught by Prof. John Wakeley at Harvard University. Fall 2011.
 - ◇ Teaching Fellow for a Undergraduate Lab Course titled “**Evolution in Action**” taught by Prof. Christopher Marx at Harvard University. Spring 2011.
 - ◇ Teaching Fellow for a Undergraduate/Graduate level **Advanced Aquatic Chemistry Lab** Course taught by Prof. James Leckie and Dr. Sandy Roberston at Stanford University. Winter 2008.
 - ◇ Teaching Fellow for a Graduate level **Aquatic Chemistry** Course taught by Prof. James Leckie at Stanford University. Fall 2007.
- Outreach*
- ◇ MSI Journal Club Coordinator, Summer 2012–13.
 - ◇ Cambridge Science Festival Organizer, “*The Science of Food*”, April 2013
 - ◇ Life Sciences Outreach Program Volunteer, 2012
 - ◇ Science Blogs author from Nov 2010-May 2011. My article, titled “The Microscopic Workforce in the Gulf of Mexico” appeared in the Science Section of the New York Times, November 2010
 - ◇ Contributed Talk on “*The Science of Fermentation*” at the Fall 2012 Science in the News Lecture Series at the Harvard Medical School.
 - ◇ Active Member of GradWagon (A Life Sciences Outreach Program at Harvard University)
 - ◇ Given several lectures on Microbial Evolution to high school and middle school students through GradWagon
- Summer Courses*
- ◇ Hopkins Microbiology Course, Hopkins Marine Station, Stanford University 2007
- Relevant Courses*
- ◇ Environmental Microbiology, Environmental Biotechnology, Environmental Microbial Genomics
 - ◇ Microbial Physiology, Microbial Evolution, Metabolic Biochemistry of Microorganisms
 - ◇ Advanced Genetics, Biostatistics, Statistics for Biology
 - ◇ Pathogens and Disinfection, Public Health Microbiology, Climate Change in the 21st Century
 - ◇ Soil Chemistry, Aquatic Chemistry, Hydrology

References

1. Christopher Marx
Associate Professor of Biology
Department of Organismic and Evolutionary Biology and the FAS Center for Systems Biology
Harvard University
Biology Labs Room 3083, 16 Divinity Avenue
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2. Colleen Cavanaugh
Edward C. Jeffrey Professor of Biology
Associate of Leverett House
Harvard University
Biology Labs Room 4081, 16 Divinity Avenue
Cambridge MA 02138
3. James Leckie
Professor, Environmental Engineering and Applied Earth Sciences
Director, Stanford Center for Sustainable Development and Global Competitiveness
Y2E2 Building Room 261, 473 Via Ortega
Stanford CA 94305
4. Craig Criddle
Professor, Environmental Engineering and Science (EES)
Senior Fellow, Woods Institute for the Environment
Y2E2 Building Room 151, 473 Via Ortega
Stanford CA 94305