

Curriculum Vitae

1. BACKGROUND

PRESENT TITLE:	Professor & Dept. Head, <i>ad interim</i> 2021 - 23 Dept. of Biology and Biotechnology, WPI
UNDERGRADUATE EDUCATION:	Birla Institute of Science & Technology, Pilani, India BS., Pharmacy 1987 - 91
GRADUATE EDUCATION:	Drexel University, Philadelphia, PA. MS., Bio & Biotech (with thesis) 1991- 94 MS., Environmental Sciences. 1991 - 94 Penn State University Medical College, Hershey, PA. Ph.D., Biochemistry & Molecular Biology 1994-99
POSTDOCTORAL TRAINING:	Whitehead Institute for Biomedical Research Cambridge, MA 1999 - 2004.
PEDAGOGY TRAINING:	SENCER Summer Institute, Santa Clara University CA. Certificate College teaching, Worcester Consortium
LEADERSHIP TRAINING:	Women in Higher Ed Leadership training 2018 Harvard University, Cambridge, MA Executive Leadership in Acad. Tech. Eng. & Sc. 2022 Drexel University, Philadelphia, PA
ACADEMIC APPOINTMENTS:	Dept. of Biology and Biotechnology, WPI Assistant Professor, 2004 - 11 Associate Professor (tenured), 2012 - 18 Professor, 2018 - present Visiting scholar, The Broad Institute of MIT & Harvard Cambridge, MA Member, Institute for drug Resistance UMass Chan Medical School, Worcester, MA
LEADERSHIP APPOINTMENTS:	Associate Dean of Graduate Studies 2019-21, WPI
HONORS & AWARDS:	American Association for the Advancement of Science, Elected Fellow 2020 American Academy of Microbiology, Elected Fellow 2018 Waksman Outstanding Teaching Award, 2018 Society for Industrial Microbiology & Biotech
PROFESSIONAL ORGANIZATIONS:	American Society for Microbiology American Association for the Advancement of Sc. National Association of Inventors Genetic Society of America Microbiology Society Medical Mycology Society of the Americas

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2. WORK EXPERIENCE other than teaching

2022	Executive Leadership in Academic Technology Engineering & Science, Drexel University, Philadelphia, PA
2021 --	Dept. Head (<i>ad interim</i>) of Biology & Biotechnology Worcester Polytechnic Institute, Worcester, MA
2019 -- 2021	Associate Dean of Graduate studies Worcester Polytechnic Institute, Worcester, MA
2019 --	Professor, Dept. of Biology & Biotechnology Worcester Polytechnic Institute, Worcester, MA
2018	Women in Higher Education Leadership Harvard University, MA.
2012 -- 2020	Associate Professor, Dept. of Biology & Biotechnology Worcester Polytechnic Institute, Worcester, MA
	<u>Affiliate appointments at WPI</u> Program in Bioinformatics and Computational Biology, WPI Program in Environmental and Sustainability Studies, WPI
2005 – 2012	Assistant Professor, Dept. of Biology & Biotechnology Worcester Polytechnic Institute, Worcester, MA
2015 --	Member Institute of Drug Resistance University of Massachusetts Chan Medical School, Worcester, MA
2011 --	Visiting Scientist, The Broad Institute MIT & Harvard, Cambridge, MA
2011 - 2015	Member Institute for Drug Resistance University of Massachusetts Chan Medical School, Worcester, MA
2005	NRSA Post-doctoral Fellow, Whitehead Institute Massachusetts Institute of Technology, Cambridge, MA Mentor: Dr. Gerald R. Fink
1991	Intern, Dept. of Fermentation Technology, Central Drug Research Institute, Lucknow, India
1989	Summer intern, Dept. of Toxicology Frederick Institute of Plant Protection & Toxicology, Chennai, India

Teaching

3. TEACHING EXPERIENCE AT WPI

A. TRAINING

- 2016 Faculty Institute for online teaching, WPI, MA
- 2012 SENCER Summer Institute, Santa Clara University, CA.
- 2006 Certificate in College teaching, Colleges of Worcester Consortium, MA

B. INNOVATIONS in teaching and Curriculum development

Under my leadership as the chair of graduate programs, and liaison for the university committee on Graduate studies and research (CGSR), I led the department in revising existing programs and offering new programs.

- **Revised degree requirements in Ph.D. in Biology & Biotechnology Implemented in 2014**

I championed a proposal through faculty governance to change the degree requirements of the Ph. D program in Biology & Biotechnology. Specifically, to offer courses that better reflect the broad field of modern Biology and Biotechnology as well as research strengths within the Department. I am particularly proud of the fact that several curricular courses such as professional ethics, experimental design and scientific writing, that were first introduced in Biology & Biotechnology Program are now being emulated by other departments and students from other departments are enrolled in these classes.

- **Offer Skills based (non-thesis) M.S. degree in Biotechnology (Implemented 2017)**

Over the last few years, market research indicates a growing demand for scientists with M.S. qualifications in the field of Biotechnology, Biochemistry and Biomedical engineering. This is reinforced by the Voice of the Customer research conducted with WPI alumni which shows a significant interest in graduate education in Biotechnology, Biochemistry and Biomedical fields. Specifically, individuals with strong hands-on lab and bio-production skills are in demand and this need is projected to grow more than average for the next 10 years. Working with an interdisciplinary team we developed a non-thesis program to address this need and position WPI as a leading provider of skills enhancement to the local labor pool. The skills-based M.S. program is designed for students who wish to be well prepared to enter the workforce as a professional scientist, providing a broad base in advanced coursework and laboratory training in techniques that are applicable to the Biotechnology Industry. The first year's enrollment goal for the MS Biotechnology Program is 10 students. In addition, this program elevates the "Research and Graduate education" aspect of WPI's Strategic Plan by increasing the visibility of WPI's Biotechnology program, along with increased program enrollment and

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revenue without a significant burden on resources both capital and human.

To ensure the smooth roll out of this program I helped develop the following courses.

- **Animal Cell Culture Technology (BB570, special topics)**
Instructor: Kamal Rashid
- **Genetic Engineering strategies to control gene expression (BB570, special topics)**
Instructors: Louis Roberts and Eric Young
- **Fermentation Biology (BB505)**
Instructors: Jean-Francois Hamel
- **Methods of Purification and Downstream Processing (BB560)**
Instructors: Eszter Birck-Wilson

Worked closely with the instructor to design a new course (BB570) or improve an existing one (BB505, BB560). These courses are designed to introduce students to the principles and techniques where students first learn, and then apply the concepts in series of lab sessions. They work in groups to plan, execute, and analyze a multi-stage process using instruments and methodologies that are the most relevant to the biopharmaceutical industry. Students follow Good Manufacturing Practices (GMP) for quality assurance that meet FDA's regulatory requirements. Finally, students evaluate the engineering and economic aspects of their lab process for scale-up.

4. COURSES TAUGHT AT WPI

The courses I have developed (no previous offering) and taught are listed below:

- **Medical Microbiology, *Plagues of the modern world* (BB3003)**
Student Demographic: sophomores and juniors, (BME, CE, BBT & CBC)
Goal: Appreciate fundamental concepts of medical microbiology
Approach: Use a case *study* facilitated learning approach to reinforce conceptual learning.

Medical Microbiology can often become a list of microbes that students have to memorize. In today's digital world where facts are on their fingertips I chose to focus on using the real-life cases as problems for differential diagnosis of infectious agents and disease management. Cases are assigned to students with a set of questions that they can only answered by exploring the assigned case and other self-study resources. My role in this process was to "guide the inquiry" by asking supplemental questions that eventually move the students towards thinking deeply and drawing more complex conclusions. This approach has resulted in increased student interest and increased mastery of content specifically for pre-health students. I believe that this immersive approach lends toward improved learning and retention, which is confirmed by the feedback that we have received from the students.

- **Disease Detectives, Introduction to Epidemiology (ID2100)**

Student Demographic: Incoming Graduate students (BBT, CBC & BME)

Goal: Learn principles of epidemiology in the context of Society

Approach: *Flipped learning* tools will be used to guide students through the analysis of 7 disease outbreaks over the 7.5-week term.

In this course, students learn about the principles of epidemiology and the role an epidemiologist plays in responding to disease outbreaks and promoting public health. We accomplish this by studying seven real world examples of disease outbreaks and the response to these events. We discuss the role of current health practices and priorities as well as the roles of global organizations and institutional players. Students are introduced to the basic principles and methods used in epidemiology to study the distribution and determinants of disease in human populations and in the development of prevention and intervention strategies. We analyze the burden of communicable diseases today and the challenges of emerging diseases. The course takes an interdisciplinary approach as epidemiologists rely on many different disciplines such as biology for understanding disease processes, statistics for making efficient and appropriate use of data, social science for understanding behavior, and engineering for analysis and assessment tools. Classes consist of lecture, intensive small group discussion, and case analyses.

- **Molecular Biology of the Cell (BB570, online graduate)**

Student Demographic: Incoming Graduate students (BBT, CBC, BCB & BME)

Goal: Foundation or ramp-up course, designed to ensure biological concept literacy.

Approach: *Online format with competency assessments* which students may attempt multiple times in order to achieve acceptable level of understanding.

I developed this online course following the pedagogical principles of *backward design*. Students navigate through the material at their own pace using the online tools in the Learning Management System. This ramp-up course is designed for returning students who wish to get up to speed in preparation for graduate school. The course covers details of molecular biology and metabolism and topics such as cellular structure, organization, growth, regulation, movements, and interaction are covered to achieve a homogenous level of student understanding and rigor. Students are allowed to retake online competency assessments to improve understanding. In addition, students engage in a peer learning exercise working on a group project where they manipulate DNA sequence, identify the open reading frame, identify the untranslated regions of the mRNA and deduce the protein sequence of insulin. Students then demonstrate their understanding of the biochemistry of glucose metabolism via a written document in response to prompts such as glucagon, gestational diabetes etc. A virtual meeting platform is available for peer discussion and integrating research and student mentoring.

- **Introduction to Biology (BB1001)** redesigned existing course

Student Demographic: non-majors, satisfying science requirement.

Goal: Engage non-majors in biology by choosing relevant topics.

Approach: "*In the News*" approach to facilitate learning.

Learning the basic principles of Biology can seem abstract for students, especially non-majors who need to fulfill their science requirements. To make the material more relevant and approachable, I adopted a "In the news" style of teaching, where I identified suitable articles from the popular press, Science Times and put these them into real life perspective. I followed each article to find related resources for teaching the underlying biological concepts and personal health. This approach helped students engage with current health related topics and in the process also get a foundation on biological science.

- **Advanced Molecular Genetics (BB4010)** redesigned existing course

Student Demographic: seniors and graduate students, (BBT & CBC)

Goal: Gain a deeper understanding of Molecular Biology and reinforcing data analysis

Approach: Use the *primary literature* only (no text book) to synthesize prior concepts.

This course was designed to coach students (particularly undergraduates) on how to mine information from primary literature. I guide the students and engage with them to facilitate readings from the primary literature to provide a historical perspective to scientific discoveries, promote critical thinking and develop individual thought. This approach prepared students to grasp the scientific heritage as well as synthesize applications of modern scientific techniques.

- **Model Systems (BB561)** developed new course

Student Demographic: Graduate students (BBT, CBC & BME)

Goal: Gain knowledge of model systems used in modern biological research.

Approach: Educate students on *use of model organisms* (benefits and pitfalls) in research through examples from the primary literature.

The scientific community has agreed on several convenient organism(s) to gain a deep understanding of basic biological systems. This approach leads to a body of knowledge in that "model system" that facilitates informed studies in complex non-model biological systems. In this course students receive an overview of the model organisms generally used in research and specifically in laboratories at WPI. This facilitates a smooth transition for the student into a career in research.

5. TEACHING EXPERIENCE PRIOR TO WPI

- **Research Supervisor**
 - MIT Junior (Fall 2002).
 - Clemson University Senior (Summer 1996)
 - Whittaker Scholar, high school senior (Summer 1995)
- **Tutor**
 - Drexel University for undergraduate students
 - Hershey Medical Center for medical students
- **Teaching Assistant**
 - Graduate level Biochemistry laboratory (Drexel University)
- **K-12**
 - Trained Boston area high school teachers (1999-2005)
 - Invited speaker High school teachers' conference (2002)
 - Developed experimental protocol to demonstrate "*Tropism in plants*" (2001-02)
 - Judge, Science Fair, Boston Rindge and Latin, (2001)

6. UNDERGRADUATE RESEARCH

Major Qualifying Projects (MQP, senior thesis project)

Note: Assistant Professor: 2005-12; Associate Professor 2013-18; Professor 2019-present

2023

- Susanna Oppong
Gut Brain axis
- Alex Guerra and Addison Writ Jones (MME)
Recycling fast food oil waste
(Co-advisor with Dr. M. Bhatia, MME, WPI)
- Michelle Pan
Determining how infected macrophages evade natural killer cell ADCC elimination.
(Co-advisor with Dr. K. Clayton, UMass Chan Medical School)
- David Dutta – **Provost MQP award**
Simulating Intestinal Microbiotic Interactions with Agent Based Modeling.
(Co-advisor with Dr. L. Ryder, BCB)

2022

- Meredith Rioux
Bacillus subtilis as a probiotic: implications for inflammatory bowel disease and intestinal colonization of *Candida albicans*.

2021

- Monet Norales and Daira Daly

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Microbiome modeling
(Co-advisor with Dr. L. Ryder, BCB)

2020

- Rose Awada and Leah Beauton
Analyzing microbial interactions in the gut microbiome
- Chris Tocci
SARS-CoV-2 Clinical Analysis.

2019

- Paisley Haskell and Erica Friel
A reverse genetic screen of *Candida albicans* mutants to understand its interaction with *Bacillus subtilis* within a live host.
(Co-advisor with Dr. J. Arguello, CBC)

2018

- Nina Murphy-Cook, Brittney Lambert, Natalie Fabrizio
Virulence of Candida auris as compared to other *Candida* spp.

2017

- Meredith Rioux
Bacillus subtilis as a probiotic: implications for inflammatory bowel disease and intestinal colonization of *Candida albicans*.
- Jeffery Letourneau – **Provost MQP award**
The role of beta-glucans in the virulence of Candida albicans.
- Eric Borges and Mackenzi McHugh
Contractile abnormalities of coronary vasculature associated with cardiac surgery.
(Research PI - Dr. R. Clements, Brown University, RI)
- Anna Wortman – **Provost MQP award**
Mapping DNA replication in Saccharomyces cerevisiae.
(Research PI - Dr. N. Rhind, UMMS, Worcester, MA)

2016

- Heather Bartlett
A rapid genotyping method for detection of single base changes in the ITS region of Candida spp.

2015

- Rony Noreldin and Jonah Rosch
Binding force of Candida albicans using Atomic force microscopy.

2014

- Chietara Japutra
Characterization of ZCFs, fungal transcription factors, associated with virulence.
- Allison Simpson – **Provost MQP award**
Epidemiological studies of Candida infections

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(Co-advisor with Dr. B. Faber)

- Michael Boyd and Damien Cabral
Targets of Filastatin

2013

- Giles Chikering
Assaying virulence in 14 clinical isolates of Candida parapsilosis

2012

- Stephanie Post and Tracy Sears
Optimization and Validation of a Pathogenesis Survival Assay with the C. elegans sterile mutant fer-1.

2011

- Danica Rili – **Provost MQP award**
Motility Mutations in Flagella.
(Research PI - Dr. G. Witman, UMMS, Worcester, MA)

2010

- Margaret Chiasson, Benjamin Landry, Kurtis McCannell and Kelly Pastor
Whole genome for fungal virulence factors using C. elegans as a model host.
- Neda Zahid, Elizabeth Clardy, Stephanie Carcieri
Analyzing the ability of modified yeast to ferment xylose to ethanol.

2009

- Christy Royer
Yeast as a tool to understand the mode of action of the antipsychotic drug clozapine.
- Nick Dufour
Global transcription machinery engineering for production of cellulosic ethanol.

2008

- Pamela Levandowsky and Muxun Zhao (Co-advisor with Dr. S. Politz)
Optimizing conditions for identifying nematode host factors that Inhibit fungal infections.
- Kyle Peet
Optimizing conditions for better ethanol production from S. cerevisiae.

2007

- Linsley Kelly and Brendan O'Brien (Co-advisor with Dr. S. Politz)
Optimizing conditions for identifying nematode host factors that inhibit fungal infections.
- Rachel Robillard
Optimizing conditions for better ethanol production from S. cerevisiae.

2006

- Meryl Gray and Zoe Lentz (Co-advisor with Dr. S. Politz)
Methods of identifying nematode host factors that inhibits or promotes

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fungal infections.

- Anthony Canzani (Co-advisor with Dr. K. Wobbe)
Microarray analysis of Arabidopsis infected with T. crinkle virus.

Interactive Qualifying Projects (IQP, intermediate level project, independent of major)

2015

- Parsant Jotikasthira, Dylan Stephen Martel and Mikhail Khibkin
Monitoring Indian Lake water shed - Telegraph and Gazette
Sponsor: Indian Lake Watershed Association, Co-advisor: Dr. C. Kasouf

2014

- Dylan Sheilds and Aaron Davis
Monitoring Indian Lake water shed.
Sponsor: Indian Lake Watershed Association, Co-advisor: Dr. C. Kasouf

2013

- Alan Gribble, Chase Cheston and Eric Plante
Invasive species of weeds in Little Indian Lake - WCVB 7 coverage

2011

- David Liston, Thomas Butler and Jared Guttman
Use of microbes in technology.

2010

- David Danico, Ethan Granoff, Evan Molenda and Matthew Ryel
Biofuels.

2008

- Erik Emmanuel Santiago Fajardo (EE) and Ronald Turba, (PH)
Brazil– a case study on large-scale use of bio-fuels. How did they do it and can it be replicated in the US?

C. Other – Summer Undergraduate Research Fellow

- Susanna Oppong (2019 and 2020)
The Gut-Brain Axis
- Victoria Mason (2009 and 2010)
Using yeast as a tool to understand the mode of action of the antipsychotic drug clozapine.

7. RESEARCH TRAINEES

Note: Assistant Professor: 2005-12; Associate Professor 2013-18; Professor 2019-present

Current

- Lohith Kunyeit (Post-doctoral Associate, 2019 - present)
Probiotic effects of Saccharomyces cerevisiae strains isolated from food.

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Former

- Romina D'Almeida, (Visiting Scholar, 2021-2023)
Current position: Higher Institute of Biological Research, Argentina
- Bo Yang (PhD, 2022)
Current position: Postdoctoral Associate (LSU Health Sc. Center)
- Asmaa Elkabti (MS, 2018)
- Samantha Bryce (MS, 2019)
Current position: Doctoral candidate, CMU, Pittsburgh, PA
- Toni Delorey (PhD, 2019)
Current position: Associate Director of Technology, Klarman cell observatory, The Broad Institute of MIT & Harvard, (Cambridge, MA)
- Pablo Reyes-Gutierrez (Postdoctoral Associate, 2017-2018)
Current position: Research Associate (Yale, New Haven, CT)
- Lohith Kunyeyit (2018, Fulbright-Nehru Scholar, India, Ph.D)
Current position: Postdoctoral research associate (WPI)
- Diego Alonso Vargas Blanco (2017, Fulbright Scholar, Peru, MS)
Current position: Scientist Orbital Therapeutics, Cambridge, MA
- Maleah Hickman (2016, Sabbatical)
- Cathrine Harwood (2016, MS)
Current position: Research Associate, U Mass Chan Medical School
- Luca Issi (2014, PhD)
Current position: Senior Biotech Analyst, RBC Capital Markets
- Charu Jain (2012, PhD)
Current position: Department Head, L. J. Institute of Applied Science, India
- Alisha Perelta (2012, MS)
Current position: Senior Research Associate, Qiagen.
- Jeff Swana (2010, MS)
Current position: Principal Research Engineer, Sanofi Genzyme
- Ally Hunter (2007, MS)
Current position: Instructor, U Mass, Amherst
- Brett Ericson (2006, MS)
Current position: Principal Engineer - Process Development, Amgen

C. Graduate thesis committee member

Note: Assistant Professor: 2005-12; Associate Professor 2013-18; Professor 2019-present

2023 Zekun Li CE (PhD)
 Lily Gadreau CE (PhD)

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2022	Sabine Hahn BB (PhD)
2021	Joe Collins CE (PhD)
2020	Diego Vargas BB (PhD)
2018	Danielle Snider, BB (MS)
2017	Diego Vargas, BB (MS) Brian Gruessener, BB (PhD)
2016	Giulia Galotto, BB (PhD)
2014	Ying Zhao, BB (PhD) Paula Bertuso, BB (MS)
2012	Sarju Patel, CBC (PhD) Melissa Mobley, BBT (PhD)
2011	Ying Yang, BBT (PhD) Harita Haridas, BBT (PhD) Prachi Gupta, BBT (PhD)
2010	Patrick Arsenault, BBT (PhD)
2009	Edith Plada, BBT (MS) Shilpa Ananthakrishnan, CBC (MS) Deli Hong, CBC (MS)
2008	Laura Ficociello BB (MS) Paola Pinzon-Arango CE (MS) Daniel Vail, BBT (MS)
2006	Yi Wang, BBT (MS)

External Thesis examiner

Note: Assistant Professor: 2005-12; Associate Professor 2013-18; Professor 2019-present

2015	Linda Archumbald, University of Maine, Biochemistry (PhD)
2014	Benjamin Vincent, MIT Microbiology (PhD)
2010	Josh Wolf, MIT Biology (PhD)

8. INDEPENDENT STUDY STUDENTS

Note: Assistant Professor: 2005-12; Associate Professor 2013-18; Professor 2019-present

2021	Kira Robinson (BBT)
2020	Sam Levitan (BBT)
2019	Abhinav Palisetii (BME) Elizabeth Hicks (BME)
2018	Erica Friel (BBT)

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	Rosemarie Awada (BBT)
2017	Renee Leclaire (BBT)
2015	Meredith Rioux (BBT)
	Sarah Martin (BBT)
2014	Daniel MacVeigh-Fierro (BBT)
2012	Chietara Japutra (BBT)
2011	Kristin Poti (BBT)
	Nouran Abdelfattah (BBT)
2010	Kimberly Joback (FPE)
2009	John Neary (BBT)
2008	Vicky Mason (BBT)
2006	Christine Feulner (CBC)

9. ACADEMIC ADVISING

Note: Assistant Professor: 2005-12; Associate Professor 2013-18; Professor 2019-present

2021	13 BBT students
2020	8 BBT students
2019	8 BBT students
2018	10 BBT students
2017	13 BBT students
2016	10 BBT students
2015	18 BBT students
2014	15 BBT students
2013	21 BBT students
	AED Pre Health Honors society (Faculty advisor)
2012	17 BBT students
2011	20 BBT students
	Pre-health Advisor
2010	20 BBT students
2009	17 BBT students
2008	13 BBT students
	Insight advising, 60 freshmen
2007	14 BBT students
2006	4 BBT Students

10. HONORS, AWARDS & OTHER RECOGNITION RELATED TO TEACHING

2018 Waksman Outstanding Teaching Award
 Each year, the Society of Industrial Microbiology and Biotechnology, recognizes one professor for their dedication and excellence to teaching and mentoring.

Scholarship

11. PUBLICATIONS

WPI Postdoctoral researchers are in italics, graduate students are identified in uppercase font, undergraduate students are identified in uppercase font and underlined. Self in all uppercase font and bolded.

Note: Professor 1-11, Associate Professor 12-17, Assistant Professor 18-20, Prior to WPI 21-30

Journal articles

1. Barone P, Duguid J, Keumurian F, Neufeld C, **RAO R**, Rolle M, Skrip B, Springs S, Vega H, Van Vliet K, Wolfrum J, Yang M (2023), Upskilling the cell therapy manufacturing workforce: design, implementation, and evaluation of a massive open online course. *SUBMITTED*
2. YANG B., Vaisvil B, Schmitt D, COLLINS JH, Young, EM, Kapatral V, **RAO RP** (2023). A correlative study of the genomic underpinnings of virulence traits and drug tolerance of *Candida auris*. *bioRxiv*
doi: <https://doi.org/10.1101/2023.04.07.536049>
3. Dohn R., Xie B, Back R, Selewa A, Eckart H, **RAO RP**, Basu A (2021). mDrop-Seq: Massively Parallel Single-Cell RNA-Seq of *Saccharomyces cerevisiae* and *Candida albicans*. *Vaccines* Dec 27;10(1):30
4. COLLINS, J H., Kunyeit, L., Weintraub, S., Sharma, N., White, C., Haq, N., Anu-Appaiah, K.A., **RAO, RP***. and Young, E. M*. 2023. Genetic basis for probiotic yeast phenotypes revealed 2 by nanopore sequencing. *G3 Genes | Genomes | Genetics*, Apr 27, 2023. * Co-corresponding authors
5. Kunyeit, L., **RAO, R.P***. and Anu-Appaiah, K.A*, 2023. Yeasts originating from fermented foods, their potential as probiotics and therapeutic implication for human health and disease. *Critical Reviews in Food Science and Nutrition*, pp.1-12. * Co-corresponding authors
6. Kunyeit, L., Kurrey, N.K., Anu-Appaiah, K.A. and **RAO, R.P.**, 2021. Secondary metabolites from food-derived yeasts inhibit virulence of *Candida albicans*. *Mbio*, 12(4), pp. e01891-21.
7. Kunyeit, L., KA, A.A. and **RAO, R.P.**, 2020. Application of probiotic yeasts on candida species associated infection. *Journal of Fungi*, 6(4), p.189.
8. BRYCE S, HEATH KN, ISSI L, Ryder EF, **RAO RP**, Using COVID-19 as a teaching tool in a time of remote learning: A workflow for bioinformatic approaches to identifying candidates for therapeutic and vaccine development. *Biochem Mol Biol Educ*. 2020;1–7.

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9. Rasapalli S, Sammeta VR, Singh S, Golen JA, Semerdzhiev D, YANG B, Silby M, **RAO R**, Ali A, Schiffer CA, and Savinov SN, (2019) Synthesis and Biological Evaluation of 4/5-Aroyl-2-aminoimidazoles as Microbial Biofilm Inhibitors *ChemistrySelect* 2020, 5, 5965 –5969.
10. Munoz JF, DELOREY T, Ford C, Li BY, Thompson DA, **RAO RP**, Cuomo CA (2019) Coordinated host-pathogen transcriptional dynamics revealed using sorted subpopulations and single macrophages infected with *Candida albicans*, *Nat Commun*, 10, 1607.
11. Kunyeit, L., Kurrey, NK, Anu-Appaiah KA, & **RAO, R. P** (2019) Probiotic Yeasts Inhibit Virulence of Non-albicans *Candida* Species. *mBio*, 10, e02307-19.
12. ISSI, L., RIOUX, M., **RAO R.** (2017) The nematode *Caenorhabditis elegans* - A versatile *in vivo* model to study host-microbe interactions. (*J. Vis. Exp.* 128(e56487).
13. Cuomo, C, Shea, T, YANG, B, **RAO R**, Forche, A (2017) Whole genome sequence of the heterozygous clinical isolate *Candida krusei* 81-B-5 (Jul10, pii:G3.10.1534/g3.117.043547).
14. VARGAS-BLANCO D, Lynn A, ROSCH J, NORELDIN R, SALERNI A, Lambert C, **RAO R**, (2017) A pretherapeutic coating for medical devices that prevents the attachment of *Candida albicans*. *BMC: Ann Clin Microbiol Antimicrob* 16(1):41
15. ISSI, L., Farrar, R. A., PASTOR, K., LANDRY, B., DELOREY, T. M, Bell, G., Thompson, D. A., Cuomo, C. A., **RAO, R. P.** (2017) Zinc Cluster Transcription Factors alter virulence in *Candida albicans*. *Genetics*, February 2017 205: 559-576.
16. Ford CB, Funt, JM, Abbey, D, ISSI, L., Oliver, BG, Guiducci, C, Martinez, DA, DELOREY, T, Li, BY, White, TC, Cuomo, C, **RAO, R. P**, Berman, J, Thompson, D, Regev, A. (2015) The evolution of drug resistance in clinical isolates of *Candida albicans*. *eLife*;4:e00662.
Featured in *eLIFE insight* (figure generated in RAO lab).
17. Fazly A, JAIN C, Dehner AC, ISSI L, Lilly E, Fidel PL, **RAO R. P ***, Kaufman PD*
a. (* Corresponding authors) (2013) Chemical screening identifies a small molecule inhibitor of *C. albicans* adhesion, morphogenesis and pathogenesis. *PNAS* 110(33): 13594-13599.
18. JAIN C, PASTOR K, Gonzalez AY, Lorenz MC, **RAO R. P.** (2012) The role of *Candida albicans* AP-1 protein against host derived ROS in *in-vivo* models of infection. *Virulence* 4: 67-76.
19. **RAO R. P**, HUNTER A, KASHPUR O and Normanly J (2010) Aberrant synthesis of Indole-3-acetic acid in *Saccharomyces cerevisiae* triggers morphogenic transition, a virulence trait of pathogenic fungi. *Genetics* 185 (1): 211-220.
Featured in the highlights section of the journal.
Featured in Faculty of 1000.
20. J CHARU, YUN M, Politz S. M, **RAO R. P.** (2008) A Patho-assay using *S. cerevisiae* and *C. elegans* reveals novel roles for yeast AP-1, Yap1 and host dual oxidase BLI-3 in fungal pathogenesis. *Eukaryotic Cell*. 8 (8) 1218-1227

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Featured in the Science highlights of the NECN Cable News network.

21. Laskowski M, Biller S, Stanley K, Kajstura T, **PRUSTY R.** (2006) Expression Profiling of Auxin-Treated *Arabidopsis* Roots: Toward a molecular analysis of lateral root emergence. *Plant and Cell Physiology* 47(6): 788-792.

Prior to WPI

22. **PRUSTY R**, Keil RL. (2004) *SCH9*, a putative kinase from *S. cerevisiae*, affects *HOT1*-stimulated recombination. *Molecular Genetics and Genomics*, 272: 264-274.
23. **PRUSTY R**, Grisafi P, Fink GR. (2004) The plant hormone, Indole acetic acid, induces invasive growth in *Saccharomyces cerevisiae*. *Proceedings of the National Academy of Sciences USA*, 101(12): 4153-57.

Featured in Faculty of 1000 'must read papers'

24. Ward TR*, Huong MJ*, **PRUSTY R***, Lau CK, Keil RL, Fangman WL, Brewer BJ. (* Equal contribution) (2000). Ribosomal DNA replication fork barrier and *HOT1* recombination hot spot: shared sequences but independent activities. *Molecular and Cellular Biology*, 20(13): 4948-57.
25. Defossez P, **PRUSTY R**, Kaerberlein M, Lin S, Ferrigno P, Silver PA, Keil RL, Guarente L. (1999). Elimination of yeast replication block protein Fob1p extends the life span of mother cells. *Molecular Cell*, 3: 447-455.

Featured in News and Views in Nature Genetics, May 1999, 22: 4-6.

26. Dickstein R, **PRUSTY R**, Peng T, Ngo W and Smith ME (1993). *ENOD 8*, a *Medicago* early nodulin gene, expressed in empty nodules. *Molecular Plant Microbe Interactions*, 6: 715-721.

Invited Review articles

27. HARWOOD, C & **RAO R. P** (2014) Host pathogen relations: exploring animal models to study fungal pathogens. *Pathogens*. Jun 30: 3(3):549-62
28. DUFOUR, N & **RAO R. P** (2011) Secondary metabolites and other small molecules as intercellular pathogenic signals. *FEMS Microbiol Lett* 314: 10-17.
29. **RAO R. P**, SWANA, J, DUFOUR N (2011), Brewing biofuels. In *Vitro Cellular & Developmental Biology - Plant* 47(6):637-649. DOI: 10.1007/s11627-011-9374-3

Book Chapters

30. YANG, B and **RAO R** (2008). Emerging Pathogens of the *Candida* Species. *Candida albicans*. IntechOpen.
31. **RAO R. P**, SWANA, J, DUFOUR N (2011) *Fermentative organisms of 5 and 6 Carbon sugars*. *Plant Biomass Conversion*, Wiley Publications, p157-199.

RAO lab student author

Haber, A.L, Biton, M, Rogel, N, Herbst, R.H, Shekhar, K, Smillie, C, Burgin, G, DELOREY, T. M, Howitt, M.R, Katz, Y, Tirosh, I, Beyaz, S, Dionne, D, Zhang, M, Raychowdhury, R, Garrett, W.S, Rozenblatt-Rosen, O, Shi, H. N, Yilmaz, O, Xavier, R.J, Regev, A. (2017) A single-cell survey of the small intestinal epithelium. *Nature*

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551(7680):333-339.

12. GRANT FUNDING

Note: Assistant Professor: 2005-12; Associate Professor 2013-18; Professor 2019-present

A. Current

- *IGNITE*, path to commercialization funding to study the efficacy and safety of probiotic yeasts in a murine model.

Role: PI
Agency: WPI
Period: 2023

B. Completed

- *Screening and Optimization of Luotoninin-based Leads for anti-Fungals and anti-Helminthics.*

Role: Co-PI
Agency: UMCCTS Pilot Project Program (PPP)
Period: 2021-22

- *B. subtilis* as a probiotic, and its role in irritable bowel disease and intestinal colonization by *C. albicans*.

Role: PI
Agency: NCCIH, NIH R15
Period: 2018-2021

The goal of this project is to explore use of *B. subtilis* as a probiotic against *Candida albicans*. The proposed research focuses on understanding the molecular mechanisms of microbial interactions in the context a live host. It also explores innate immune responses of the host.

- *Role of genome plasticity during the host-pathogen interactions in C. albicans.*

Role: Co-PI (PI: Anja Forche, Bowdoin College, ME)
Agency: NIAID, NIH
Period: 2018-2021

This sub-contract will be used to analyze various *Candida albicans* strains in an ex vivo macrophage model of infection.

- *Infectious Disease Genomics: Pathogen evolution, emergence and host interaction.*

Role: Co-PI (multi-institution award including MIT, Harvard, Duke & WPI)
Agency: NIAID, NIH U19 Center grant, one of three in the country
Period: 2016-2018

Understand basic biology that underlies the host-pathogen interactions. The areas of

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focus are: viral, bacterial, fungal, and parasitic diseases, and vectors responsible for transmission. I am a Co-PI in the Fungal section of the U19 grant.

- *Methods for BioHydrogen production*
 Role: PI
 Agency: Massachusetts Clean Energy Council
 Period: 2015-2016
- *Identify fungal mutants with reduced β -glucan.*
 Role: PI
 Agency: Immunexite, Inc
 Period: 2016-2017
- *Novel antimicrobial strategies.*
 Role: PI
 Agency: Irving Backman & Associates
 Period: 2013-2014
- *Drug Development strategies for antifungal therapeutics for *C. albicans*.*
 Role: Co-PI (Co-PI: Kaufman, P)
 Agency: UMMS-WPI Collaborative
 Type: Pilot Project Program (CPPP)
 Period: 2010-2012
- *Engineering yeast for production of cellulosic ethanol.*
 Role: PI
 Agency: EdeniQ, Inc
 Type: Sponsored Research Agreement (SRA)
 Period: 2008 – 2009 (No cost extension until 2/2011)
- *Synthesis of Indole Acetic Acid in *S. cerevisiae*.*
 Role: PI
 Agency: WPI
 Type: Faculty Research Award (FAR)
 Period: 2005 – 2006

13. INVITED PRESENTATIONS

Note: Assistant Professor: 2005-12; Associate Professor 2013-18; Professor 2019-present

1. Higher Institute of Biological Research, Tucuman, Argentina 2020
*Using *C. elegans* to study microbial interactions in a live host*
2. Center for Global Public Safety, Online 2019
A global Pandemic, WPI's approach to teaching, research and real-world impact.
3. International conference on Candida and Candidiasis, Providence, RI, 2018
Orphan transcription factors – role in fungal virulence.
4. Dept. of Chemistry, Univ. of Massachusetts, Dartmouth, 2017
Orphan transcription factors – role in fungal virulence.

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5. Dept. of Biology, Clark University, 2016
Orphan transcription factors – role in fungal virulence.
6. Dept. of Biology, Univ. of Massachusetts, Boston, 2014
Orphan transcription factors – role in fungal virulence.
7. North East Candida meeting, Bowdoin College, Maine, 2014
Orphan transcription factors – role in fungal virulence.
8. Dept. of Microbiology, Tel Aviv University, Israel, 2013
Understanding and managing fungal infections.
9. World Biotech Congress, Boston, MA, 2013
Understanding and managing fungal infections.
10. Microbial Pathogenesis retreat, Dartmouth Univ, Lake Morey Resort, VT, 2012
Understanding and managing fungal infections.
11. Dept. of Biology, Rhode Island College, Providence, RI, 2012
Understanding and managing fungal infections.
12. Dept. of Microbiology, University of Maine, Orono, ME, 2012
Understanding and managing fungal infections.
13. Global Women's Leadership Forum, WPI, Worcester, MA, 2012
Panel discussion on Work Life Balance.
14. Dept. of Microbiology, University of Tennessee, Knoxville, TE, 2011
Understanding and managing fungal infections.
15. Dept. of Plant, Soil and Insect Biology, Univ of Massachusetts, Amherst, MA, 2010
Secondary metabolite signals in pathogenesis.
16. Human Fungal Pathogenesis, Nice, France, 2009
Worms, constipation and yeast infections.
17. New England area Arabidopsis meeting, Boston, MA , 2009
Small yet Mighty, IAA a small molecule signal in yeast.
18. Center for Regenerative Biology and Engineering, WPI, Worcester, MA, 2008
Cues fungi use.
19. Symposium on Biofuels and plant derived products, WPI, Worcester, MA, 2008
Awesome power of yeast.
20. Arkansas Bioscience Institute, Arkansas State University, Jonesboro, AR, 2008
Cues fungi use: small molecule signaling in yeast.
21. Center for Systems Biology, Harvard University, Cambridge MA, 2006
Cues fungi use: small molecule signaling in yeast.
22. Boston College, School of Law, Newton, MA, 2006
The Human Genome project: implications on law.
23. ECI Biotech, Worcester, MA, 2005
Cues fungi use.
24. New England area Arabidopsis meeting, Boston, MA, 2003

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Perception and transport of IAA in yeast.

25. International yeast meeting, Gothenburg, Sweden., 2003
Perception and transport of plant hormones in yeast.
26. Oberlin College, Oberlin, OH, 2003
Cues fungi use.
27. High school teachers' conference, Boston, MA, 2002
Tropism in plants.
28. Pathogenesis and Host response meeting, Cold Spring Harbor Labs, NY, 2001
The plant hormone IAA enhances pseudohyphal growth in S. cerevisiae.

Selected student presentations

- | | |
|------|---|
| 2022 | Bo Yang (Poster)
ASM, Microbe conference, Washington DC |
| 2021 | Lohith Kunyeyit (Poster)
ASM Conference on Biofilms, Charlotte, NC |
| 2019 | Lohith Kunyeyit (Poster)
ASBMB Annual meeting, Orlando, FL |
| 2018 | Bo Yang (Poster)
International Conference on Candida & Candidiasis, ASM, Providence, RI |
| 2018 | Toni Delorey (Platform Talk)
Cellular & Molecular Fungal Biology, Gordon Conference, Holderness, NH |
| 2017 | Toni Delorey (Poster)
Immunology of Fungal Infections Gordon Research Conference,
Galveston, TX |
| 2016 | Toni Delorey (Invited Talk)
Candida and Candidiasis, Seattle, WA |
| 2014 | Luca Issi (Invited Talk)
Candida and Candidiasis, San Francisco, CA |
| 2011 | Charu Jain (Poster)
Fungal Genetics conference, Asilomar, CA

Charu Jain (Invited Talk)
Boston Area Yeast Meeting, Cambridge, MA |
| 2010 | Charu Jain (Poster),
Model Organism to Human Biology, Boston, MA

Jeff Swana (Poster),
Annual Conference on Biofuels, Amherst, MA |
| 2008 | Charu Jain,
Yeast Molecular Biology & Genetics Conference, Toronto, Canada |
| 2007 | Charu Jain (Invited Poster)
Consortium Research showcase, Worcester, MA |

Curriculum Vitae

14. PATENTS

- 2023 Genome wide analysis of novel probiotic yeasts with therapeutic potential
(PCT Filed – March 2023)

- 2013 US Patent #8541197, Issued Sept 24
Targets, including Yap1, for antifungal drug discovery and therapy.
Co-Inventor – Dr. S. Politz

- 2011 *Identifying Antifungal Agents that Inhibit IAA or a YAP Family Member.*
(PCT Filed – March 2011)

- 2010 *Methodology for high-throughput screening for compounds that affects
fungal adhesion and identification of primary candidates.*
Co-Inventor – Dr. P. Kaufman
(Invention Disclosure Filed - November 2010)

15. CONSULTING

- 2008 Consultant, Altra Biofuels, Visalia, CA

- 2007 Scientific advisory board member of Hy-SyEnce, Fall River, MA

Hy-SyEnce was a startup company whose goal was to commercialize
Microbial Fuel Cells for extracting energy from wastewater and producing
environmentally cleaner wastewater.

16. SCHOLARSHIP IN PROGRESS

WPI graduate students are identified in uppercase font, undergraduate students are identified in uppercase font and underlined. Self in all uppercase font and bolded.

1. De Boer, C, DELOREY, T, Knaack, S, Pfiffner, J, Ye, C. J, Thompson, D, Roy, S, Regev, A, **RAO R.** Role of duplication and divergence in the evolution of transcription factor function.

2. L. Kunyeit and **RAO R.** Potential probiotic, *Bacillus subtilis*, to counteract *Candida albicans* and *Candida auris* virulence and infections.

3. R. D'Almeida, **RAO R.** et al. Neuro-immune responses and transgenerational epigenetic inheritance of *Caenorhabditis elegans* against *Candida albicans* infection.

17. PROFESSIONAL SOCIETIES

Curriculum Vitae

- American Association for Advancement of Sciences (AAAS)
- New York Academy of Sciences (NYAS)
- Genetic Society of America (GSA)
- American society for Microbiologist (ASM)
- American Academy of Microbiology (AAM)
- Microbiological Society
- Medical Mycological Society of America (MMSA)
- Society for Industrial Microbiology and Biotechnology (SIMB)
- International Society for Human and Animal Mycology (ISHAM)
- National Academy of Inventors (NAI)
- The Indus Entrepreneur (TiE)

18. EDITORIAL AND REFEREE ACTIVITIES

Editorial positions

PLoS One

mBIO

Frontiers in Microbiology

ReviewerJournal articles

- Eukaryotic Cell
- Genetics
- PLoS One
- PLoS Genetics
- BioMed Central
- Current Medicinal Chemistry
- mBio
- Virulence
- Scientific Reports
- G3
- eLIFE

Grants

- NIH Panel Fall 2019
- NSF Panel Fall 2017
- NSF (Ad hoc, 2007)
- Research Council of Univ. of Leuven (Belgium/EU)
- Pierce's Disease Grant Management (CA/USA)

19. HONORS & AWARDS

Academic Honors

2020 Fellow of the American Association for the Advancement of Science, Elected

Curriculum Vitae

- 2018 Fellow of the American Academy of Microbiology, Elected
- 2018 Waksman outstanding teaching award
- 2013 US Patent #8541197, Issued Sept 24
- 2007 Cover feature WPI's "Research" magazine
- 2001 Monsanto Microarray award
- 2000 NIH Ruth L. Kirschstein NRSA F32 postdoctoral fellowship
- 1999 Helen Hay Whitney postdoctoral fellowship, finalist
- 1998 Outstanding student award, American Institute of Chemists foundation

Awards to my students

WPI graduate students are identified in uppercase font, undergraduate students are identified in uppercase font and underlined. Self in all uppercase font and bolded.

- 2018 TONI DELOREY, WPI Travel Award
Gordon Research Conference, Holderness NH
- 2017 TONI DELOREY, Registration Waiver
Gordon Research Conference, Galveston, TX
JEFFERY LETOURNEAU
Provost MQP award
- 2014 TONI DELOREY, WPI Travel Award
International Conference on Candida and Candidiasis
ALLISON SIMPSON
Provost MQP award
- 2012 LUCA ISSI, GSA Travel Award
International Conference on Candida and Candidiasis
- 2011 LUCA ISSI, *Teaching Assistant of the year* award
DANICA RILI
MQP award
- 2010 VICKY MASON, SURF award
CHARU JAIN, poster award, selected for Innovation presentation competition
- 2009 VICKY MASON, SURF award
NICK DUFOUR & JEFF SWANA, *Sustainability* Poster award
- 2008 ALLY HUNTER, *Danielli* graduate research award
ALLY HUNTER, *Sigma Xi* award
- 2006 ALLY HUNTER, GRAD poster award
- 2005 RACHEL ROBILLARD, *Ignite Clean Energy* Business Plan Competition
Part of WPI team "BioOctane" that competed in the final round.
Sponsored by - MIT Enterprise Forum, Energy Special Interest Group

Service

20. PROFESSIONAL

2020	ELATES, Drexel University, Philadelphia PA
2018	Women in Higher Education Leadership Program, Harvard University School of Education, Cambridge MA
2018 --	Develop and offer career workshop for International Candida and Candidiasis conference 2018: Providence, 2020: online, 2023: Montreal
2017	NSF Review Panel member (Fall)
2009 --	Academic Editor PLOS One
2011 & 2006	Panelist, Professional Development for postdocs and grad students Yeast Genetics & Molecular Biology, Princeton (2006) Fungal genetics conference, Asilomar (2011)
2007 - 2010	Member, Scientific Advisory board Hy-SyEnce, Fall River, MA
2007 & 2009	Panelist -"How to find an academic job" MIT Postdoc Association, Cambridge, MA

21. UNIVERSITY AND DEPARTMENT

University

2021	<ul style="list-style-type: none"> Member of the Search committee for Mechanical and Materials Engineering Dept. (The Largest dept. at WPI)
2019 -21	<ul style="list-style-type: none"> Corona virus Emergency Response Team (CERT) Member of Provost Finance strategy team
2017 -19	<ul style="list-style-type: none"> Elected member, Committee on Graduate Studies & Research Co-chair, Committee on Graduate Studies & Research
2016	<ul style="list-style-type: none"> Speaker at "Women of WPI weekend" WPI business continuity planning committee
2016 --	<ul style="list-style-type: none"> Member, BCB Steering Committee Co-Chair, GPH minor Faculty mentor for New Tenure Track faculty Selection committee for Charles O' Thompson scholars (Freshman class)

Curriculum Vitae

2015

- WPI web development team
- Faculty mentor for New Tenure Track faculty
- Panelist, Winter Preview Admissions “Ask the Experts”
- WPI Task Force (COAP) that revised promotion criteria to be inclusive.
- Member of Provost search committee, faculty lunch

2014

- Member, Strategic Planning team for Research and PhD education
- “Thought leaders” team to recruit President Leshin.

2013 --

- WPI New Student Orientation (NSO)

2012

- Fall Commencement speaker, WPI
- Panelist, *Work-Life balance*, Global Women's leadership Forum
- Member, Search committee for Research Librarian
- Member, WPI Language Institute Task Force

2011

- Member, WPI Global Task Force (Appointed by Dean)

2010

- Member, *IMPACT* institutional branding assessment committee
- Liaison, New England Area Arabidopsis meeting

2009

- Member, search committee (Appointed by President)
for Department Head, Chemistry and Biochemistry

2008

- Member, Strategic and Campaign Planning Task Force (Appointed)

2007 - 09

- Committee on Advising and Student Life (Elected)
2007- secretary
2009 - co-chair

2006 -14

- Radiation Health and Safeguards Committee (Appointed)
- Intellectual Policy Review Committee (selected)

2012

- Search committee for Research and Instruction Librarian

Department

2021 -23

Fundraising for BBT
Organized a reception at *BIO International Conference (Boston)*
Organized Conference and Career fair with Nature conferences, U Mass
Chan and industry partners entitled “*Cracking the code*” hosted at WPI

2016 -18

Organizer for *Next-in-BIO*, Graduate Recruiting event at WPI

Curriculum Vitae

- 2015 -17 Department Post-Tenure Teaching Review Committee
- 2014 -16 Department Tenure Committee
- 2011 -- Chairperson, Graduate Programs
Led initiatives in various aspect of building the graduate programs
- 2013 Faculty Search Committee
- 2011
 - Member, Web development Team
 - *Closer look* (presentation for prospective students and their parents)
- 2010 *WPI's Green Energy Initiative* (presentation to Sc. Adv. Board)
- 2009 -13 Volunteer (record minutes at departmental faculty meeting)
- 2006 -10 Member department graduate committee
- 2006 & 2008 Faculty Search Committee

22. COMMUNITY

- 2016 -- Developed Class room project on biofilms and Job Shadowing
Acton-Boxborough High School (Aaron Mathieu)
- 2014 *Diseases – genetic vs. infectious*, Cabot School, (Fifth Grade) Newton, MA
- 2011 -14 *Program Enrichment* committee, Cabot School, Newton, MA
- 2011 *Lab demonstration*, Biotech program,
Assabet Valley Regional Technical High School
- 2010 *Research mentor*, Worcester Academy students, Worcester, MA
Alexandra Ojerholm and James Smith (Contact - Fran Smith)
- 2009
 - Proposal to fund an outdoor classroom, Cabot School, Newton, MA
 - *K-12 project* "virtues of hand washing", Cabot School, Newton, MA
 - *Research mentor*, Mass Academy student, Worcester MA
Raat Goyal (Contact – Rob Traver)

Prior to WPI

- 2002
 - Laboratory unit "Demonstrating tropism in plants".
Implemented at Hingham High (2001)
Implemented at Holliston High (2002)
 - *Judge*, Science fair
Boston Rindge and Latin, 2001
 - *Keynote speaker*
High school teacher's conference, 2002
-