

## **GYANESHWAR PRASAD (aka GP)**

Professor and Chair

Department of Biological Sciences

University of Wisconsin Milwaukee

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I am a bacterial physiologist and geneticist interested in understanding bacterial responses to biotic and abiotic stresses. I have Ph.D in Biochemistry from M. S. University of Baroda, India, post-doctoral training at the International Rice Research Institute, Philippines, University of California Berkeley and University of Minnesota. I am now a US citizen and professor at University of Wisconsin Milwaukee. Current research aims at identifying mechanisms of interactions between plants and beneficial bacteria for sustainable agriculture.

### **Education**

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|-----------|--|
| 1992-1998 | Ph.D (Biochemistry) Maharaja Sayajirao University of Baroda-India<br>(Thesis title: Isolation and characterization of phosphate solubilizing microorganisms suitable as biofertilizers in alkaline soils; Professor L. J. Parekh and Dr. G Naresh Kumar) |
| 1988-1990 | M.Sc (Biochemistry) Maharaja Sayajirao University of Baroda-India<br>Thesis: Phytochrome regulation of isocitrate lyase in germinating cucumber seedlings; Professor Srivastava  |
| 1985-1988 | B.Sc (Botany, Zoology, Chemistry) Osmania University<br>Hyderabad-India  |

### **Academic Appointments**

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|--------------|---|
| 2023-Present | Professor, Tenured, University of Wisconsin Milwaukee   |
| 2013-2023    | Associate Professor, Tenured, University of Wisconsin-Milwaukee   |
| 2007-2012    | Assistant Professor, University of Wisconsin-Milwaukee  |
| 2004-2007    | Research Associate, University of Minnesota, St Paul<br><i>Supervisor: Dr. Arkady Khodursky</i>                                 |
| 2003-2004    | Associate Specialist, University of California, Berkeley<br><i>Supervisor: Professor Sydney Kustu (National Academy Member)</i> |
| 2000-2003    | Post-Doctoral Fellow, University of California, Berkeley<br><i>Supervisor: Professor Sydney Kustu (National Academy Member)</i> |

1998-2000                      Project Scientist, International Rice Research Institute, Philippines  
*Supervisor: Dr. J. K. Ladha*

1993-1997                      Lecturer, Maharaja Sayajirao University of Baroda, India

### **Administrative Experience**

2022- Present                      **Chair**, Biological Sciences, University of Wisconsin Milwaukee.

Providing leadership and vision to the teaching, research and service mission of the department. The department teaches more than 17,000 student credit hours for undergraduates and 800 credit hours for graduate students. The department is also research intensive with more than US\$ 14 million in extramural grants.

Supervising administrative oversight for operation of the department in accordance with shared governance involving faculty, teaching and non-teaching staff. Collaborating with administrative support faculty including Associate Chair and undergraduate coordinator (Dr. Sonia Bardy) and graduate coordinator (Dr. Gerlinde Hoebel).

Supervising and managing a team of support staff including the managers of Microscopy and Biotechnology Facilities, Greenhouse and five undergraduate teaching laboratories.

Representing the department to the university administration, students and the public. Hiring and mentoring new faculty and promotion of existing faculty and staff. Negotiating and coordinating with leadership of the College and University.

Collaborating with chairs of other natural science departments to enhance student success and research.

### **Accomplishments**

- Supervised the search and hiring of two new faculty (Assistant Professor)
- Organized and led the promotion of two faculty (Associate Professor to Full Professor) and currently supervising promotion and tenure of Assistant Professor
- Managed department budget and prioritize spending on various items.
- Managed post-tenure reviews and annual performance evaluations.
- Resolved conflicts between teaching and research workloads.
- Organized and led faculty and executive committee meetings in accordance with departmental and universities policies.

- Provided guidance to various departmental sub-committees for specific motions and organized the approvals by faculty/executive committees.
- Conducted undergraduate program review and implemented the recommendation of UWM review committee for program improvement.
- Implemented a more efficient open advising for undergraduate student success designed by the previous chair.
- Organized a sub-committee to improvise the foundational courses to improve DFW rates.
- Started a departmental LinkedIn page and newsletter to enhance alumni outreach.

2019-2022                    Chair, Personnel committee, Biological Sciences. The committee is responsible for evaluating performance of faculty, conducting post-tenure reviews, faculty sabbaticals and nomination of faculty for university awards.

2017-2022                    Member, Institutional Biosafety committee, University of Wisconsin Milwaukee. IBC oversee biological research at UWM involving recombinant and synthetic nucleic acid molecules in accordance with the National Institute of Health Guidelines.

### **Professional Workshops and Trainings (UW Milwaukee)**

- Nuts and Bolts of Department Administration
- University Policies
- Workshop on Diversity Equity and Inclusion
- UWM Data 101
- Workshop on student success (Center for Learning Technologies and Accessibility Resource Center, UWM)
- Conflict Coaching
- Title IX Training
- Higher Learning Commission Accreditation Process
- Talent Development and Coaching
- Administrative summit

### **Other Service to the Department**

2022-Present                    Chair, Colloquium committee. Coordinated with faculty to invite speakers, arranged logistics for the speakers. In charge of colloquium as a graduate seminar course

2021                                Search committee, Microbiology Faculty Recruitment

Reviewed more than 100 applications, conducted zoom and in person interviews and successfully recruited Dr. Alita Burmeister (PDF from Yale University)

- 2019 Search committee, Microbiology Faculty Recruitment  
Reviewed more than 130 applications, conducted zoom and in person interviews. The search was cancelled due to COVID
- 2011-2017 Graduate Committee. Reviewed graduate (Ph.D. and MS) student applications and recommended admission decisions
- 2010-2012 Course and Curriculum Committee. Reviewed applications for new course, modifications to existing courses, program changes
- 2010 Search committee, Manager, Biotechnology Facility. Conducted in person interviews and successfully recruited Dr. Marianna Orlova (PDF from Columbia University)
- 2009 Search committee, Microbiology Faculty Recruitment  
Reviewed more than 130 applications, conducted in person interviews and successfully recruited Dr. Sonia Bardy (PDF from University of Michigan)

### **Teaching Experience**

- 2008-current BIOSCI 540/740; Microbial Diversity and Physiology  
*Course description:* To provide students with broad knowledge about microbial physiology and metabolism. In-depth knowledge of microbial metabolic function is essential in order to give biochemical, physiological and ecological meaning to the ever-increasing genomic information. The course is open to senior undergraduates and graduate students.
- 2020-current BIOSCI 383; General Microbiology  
*Course description:* To provide students with a foundation in microbiology that will serve as a basis for further studies in biological sciences or for professional training in health sciences. This is a gateway course for microbiology major.
- 2016-2020 BIOSCI 101; General Survey of Microorganisms  
*Course description:* Study of nature and activities of microorganisms. Topics include survey of microorganisms (bacteria, fungi, and viruses), infection diseases, host-defenses. Intended primarily for nursing students.

- 2011-2013                    BIOSCI 607; Environmental Microbiology  
*Course description:* To provide students with broad knowledge about microbial ecology and function in the environment. The course will discuss the molecular and metagenomic analysis of the microbial population, microbial function in biogeochemical cycles and sustainability; microbial association with plants, rhizobial-legume symbiosis; Microbial stress responses including quorum sensing and biofilm formation; Role of microbes in production of alternative and green energy; Microbial mediated bioremediation of toxic compounds. The course is open to senior undergraduates and graduate students.
- 2010-2014                    BIOSCI 925; Graduate Seminar in Microbiology  
*Course description:* To analyze primary literature and present published papers/own research in front of peers and faculty.

### **Academic Advising**

- 2010-current                Faculty academic advisor to undergraduate students  
 Biological Sciences Majors (35 students)
- 2010-current                Faculty committee member for graduate students  
 Biological Sciences Ph.D. (20 students)

### **Research Mentorship Experience**

#### ***Graduate students (in progress)***

- 2022-current                Sonali Shedge (Ph.D.)  
 Dissertation title: *Rhizobial-legume symbiosis in changing climate*

#### ***Graduate students (completed)***

- 2017-2023                    Shashini Welmillage (Ph.D.)  
 Dissertation title: *Characterizing symbiotic interactions between Paraburkholderia phymatum and its legume hosts*  
 Currently Post-Doctoral Fellow at UW Madison
- 2017-2019                    Zachary Zawada (MS)  
 Dissertation title: *Exploring primitive legume symbiosis using Chamaecrista fasciculata as a model*  
 Currently Project Manager, Church and Dwight, Waukesha, WI

- 2010-2016 Justin Speck (Ph.D.)  
Dissertation title: *Role of sulfur metabolism in effective plant-microbe interactions*  
Currently Assistant Professor, Concordia University, WI
- 2011-2015 Shubhajit Mitra (Ph.D.)  
Dissertation title: *Interaction of Rhizobium sp. IRBG74 with a legume (Sesbania cannabina) and a cereal (Oryza sativa)*  
Currently at PureSense Inc, Ontario, Canada.
- 2009-2014 Seema Das (Ph.D.)  
Dissertation title: Functional and genetic characterization of sulfatases in *Salmonella enterica* serovar Typhimurium  
Currently at Therapure Biopharma Inc, Ontario, Canada

### Post-Doctoral Trainees

- 2017-2019. Dr. Laura Ketelboeter  
2015-2017. Dr. Katharyn Affeldet  
2013-2014. Dr. Adwaita Parida  
2008-2010. Dr. Gopit Shah

### Graduate Students Advisory Committee

- 2022-current Mackinnley Rybolt, Ph.D. student of Dr. Sonia Bardy  
2022-current Tarnjit Kaur, Ph.D student of Dr. Sergei Kuchin  
2022-current Sophia Ward, MS student of Dr. Sandra Mclellan (Freshwater)  
2020-current Alyssa Kline, Ph.D. student of Dr. Sonia Bardy  
2018-2023 Nathaniel Thorngate, MS student of Dr. John Berges  
2020-2022 Samuel Engel, MS student of Dr. Sonia Bardy  
2020-2022 Brigid Meyers, MS student of Dr. Sandra Mclellan  
2018-2020 Zachary Hying, MS student of Dr. Sonia Bardy  
2017-2021 Natalie Rumball, Ph.D. student of Dr. Sandra Mclellan  
2014-2021 Jacob Grothjan, Ph.D. student of Dr. Erica Young  
2013-2019 Rini Banerjee, Ph.D. student of Dr. Daad Saffarini  
2013-2019 Liwei Fang, Ph.D student of Dr. Ching-Hong Yang  
2012-2017 Vibhuti Jansari, Ph.D. student of Dr. Sonia Bardy  
2010-2016 Yuan Xiochen, Ph.D student of Dr. Ching-Hong Yang  
2009-2015 Devanshi Khokhani, Ph.D student of Dr. Ching-Hong Yang  
2009-2014 Swati Singh, Ph.D. student of Dr. Steven Forst  
2008-2014 Ken Brockman, Ph.D. student of Dr. Daad Saffarini  
2008-2013 William Hutchins, Ph.D student of Dr. Ching-Hong Yang  
2008-2013 Shane Wessner, Ph.D student of Dr. Eric Cheng  
2008-2011 Namita Shroff, Ph.D. student of Dr. Daad Saffarini

2008-2011                      Areen Banerjee, Ph.D. student of Dr. Daad Saffarini  
2008-2011                      Lakisha Barrett, Ph.D. student of Dr. Sergei Kuchin

### **Undergraduate Research Trainees**

Sara Saleh  
Nathaniel Thorngate  
Kaitlin Salter  
Zachary Hying  
Jacob Schemm  
Leo Bohlmann  
Anthony Bichler  
Daniel Friedrich  
Sydney Rausch  
Brigit Blemberg  
Megan Dexter  
Catherine Dornfield  
Nicole Poweleit

### ***Student presentations at symposia***

Welmillage S, Gyaneshwar P (2022). A putative polysaccharide biosynthesis operon is involved in the nodulation of *Mimosa pudica* by *Paraburkholderia phymatum*. 28<sup>th</sup> North American Symbiotic Nitrogen Fixation Conference, University of Wisconsin Madison. June 5-8.

Welmillage S, Gyaneshwar P (2021). The effect of mineral nitrogen on symbiosis between *Mimosa pudica* and *Paraburkholderia phymatum*. ASM North Central Branch Meeting, South Dakota State University, Brookings. SD.

Saleh S, Welmillage S, Gyaneshwar P (2019). Motility is important for competitive nodulation of *Mimosa pudica* by *Paraburkholderia phymatum*. 7<sup>th</sup> Annual Student Research Symposium. November 9<sup>th</sup>. Riveredge Nature Center, Saukville, WI.

Hess K and Gyaneshwar P (2019). Characterizing symbiotic interactions between *Rhizobium* sp. IRBG74 and *Sesbania* in aquatic conditions. November 9<sup>th</sup>. Riveredge Nature Center, Saukville, WI.

Bohlmann L, Benko A, Ketelboeter LM, Gyaneshwar P (2019). Characterizing flavonoids in root exudates of the non-nodulating legume honey locust using HPLC/MS. National Conference on Undergraduate Research, April 11-13. Kennesaw State University, GA, USA.

Welmillage S, Ketelboeter L, Gyaneshwar P (2018). Mechanisms of Legume Symbiosis in Nature: Utilizing *Paraburkholderia-Mimosa* Interactions in Soil As a Model. 7<sup>th</sup> Annual Student Research Symposium. November 10<sup>th</sup>. Riveredge Nature Center, Saukville, WI.

Ketelboeter LM, Zawada Z, Sreevidya VS, James EK, Gyaneshwar P (2018). Do nodulating and non-nodulating primitive (Caesalpinoid) legumes share nitrogen-fixing symbionts? 24<sup>th</sup> North American Symbiotic Nitrogen Fixation Conference, May 20-23,

University of Manitoba Winnipeg, Canada.

Ketelboeter LM, Zawada Z, Schemm J, Gyaneshwar P (2017). Do nodulating and non-nodulating primitive (Caesalpinoid) legumes share nitrogen fixing symbionts? ASM North Central Brach Meeting, October 6-7, St Nobert College, De Pere, WI. USA

Hying Z, Sambukumar S, Ketelboeter L, Paegelow D, Owen H, Gyaneshwar P (2017). Can nitrogen fixation in legumes occur without nodules? Exploring the rhizobial interactions with non-nodulating legume *Gleditsia triacanthos*. ASM North Central Brach Meeting, October 6-7, St Nobert College, De Pere, WI. USA

Affeldt K, Mitra S, Gyaneshwar P (2015). The role of rhizobial ABC transporter in biofilm formation and colonization of legume and cereal hosts. 23<sup>rd</sup> North American Symbiotic Nitrogen Fixation Conference, December 6-10, Ixtapa, Mexico.

Rausch S, Gyaneshwar P (2014). Nodulation of invasive vetch (*Vicia sativa*) by rhizobia isolated from nodules of native vetch (*Vicia americana*). National Conference on Undergraduate Research, April 3-5, Lexington, KY, USA.

Rausch S, Mitra S, Gyaneshwar P (2014). Endophytic Colonization and Growth Promotion of Rice (*Oryza sativa*) by *Azoarcus olearius* DQS4. National Conference on Undergraduate Research, April 3-5, Lexington, KY, USA.

Blemberg B, Mitra S, Gyaneshwar P (2014). An ABC type Transporter is essential for biofilm formation, nodulation of *Sesbanina cannabina* and endophytic colonization of rice (*Oryza sativa*) by *Rhizobium* sp. IRBG74. National Conference on Undergraduate Research, April 3-5, Lexington, KY, USA.

Das, S, Gyaneshwar P (2012). Genetic Regulation of arylsulfatase in *Salmonella typhimurium* LT2. 19<sup>th</sup> Annual Midwest Microbial Pathogenesis Conference. September 7-9. Milwaukee, WI, USA.

## **Research**

### **Overview**

The research in my lab is focused on bacterial-host interactions concentrating on bacteria involved in symbiotic and associative nitrogen fixation with plants but also human and animal pathogens. My lab is particularly interested in studying the role of bacterial organic sulfur metabolism on symbiotic nitrogen fixation and pathogenesis, nodulation mechanisms of  $\beta$ -proteobacteria (as compared to the well-studied  $\alpha$ -proteobacteria), symbiotic interactions in *Caesalpinioideae* subfamily of legumes (diverged from the widely studied *Papilionoideae* 60mya), Rhizobial entry through lateral root cracks (as compared to root hair infection), nitrogen fixation in non-nodulating legumes and rhizobial interactions with non-legumes. The long-term objective is to enhance our understanding of rhizobial-legume/nonlegume interactions by developing new model systems.

### ***Peer Reviewed Publications***

Google Scholar Citations: 5308; H-Index: 25



1. Ketelboeter LM, Mitra S, **Gyaneshwar P** (2023). A thiamine transporter is required for biofilm formation by *Rhizobium* sp. IRBG74. *FEMS Microbiol Lett* 370: 1-7.
2. Ketelboeter LM, Gordon A, Welmillage SU, Sreevidya VS, Paliy O, **Gyaneshwar P** (2023). Transcriptomic and physiological responses of *Rhizobium* sp. IRBG74 to *Sesbania cannabina* and rice rhizosphere. *Plant Soil* 483: 515-532.
3. Welmillage SU, Zhang Q, Sreevidya VS, Sadowsky MJ, **Gyaneshwar P** (2021). Inoculation of *Mimosa pudica* with *Paraburkholderia phymatum* results in changes to rhizoplane microbial community structure. *Microbes Environ* 36 (1)
4. Speck J, James EK, Sugawara M, Sadowsky MJ, **Gyaneshwar P** (2019). An alkane sulfonate monooxygenase is required for symbiotic nitrogen fixation by *Bradyrhizobium diazoefficiens* (syn. *Bradyrhizobium japonicum*) USDA110<sup>T</sup>. *Appl. Environ. Microbiol.* 85, e01552-19.
5. Das S, Sreevidya VS, Udvadia A, **Gyaneshwar P** (2019). Dopamine-induced sulfatase and its regulator are required for *Salmonella enterica* serovar Typhimurium pathogenesis. *Microbiol.* 165: 302-310.
6. Zhao CZ, Huang J, **Gyaneshwar P**, Zhao DD (2018). *Rhizobium* sp. IRBG74 alters Arabidopsis root development by affecting auxin signaling. *Front. Microbiol.* 8,2556.
7. Mitra S, Mukherjee A, Wiley-Kalil A, Das S, Owen H, Reddy PM, Ane J-M, James EK and **Gyaneshwar P**. (2016). A rhamnose-deficient lipopolysaccharide mutant of *Rhizobium* sp. IRBG74 is defective in root colonization and beneficial interactions with its flooding-tolerant hosts *Sesbania cannabina* and wetland rice. *J. Expt. Bot.* 67: 5869-5884.
8. Crook M, Mitra S, Ane J-M, Sadowsky MJ and **Gyaneshwar P**. (2013). Complete genome sequence of the *Sesbania* symbiont and rice growth-promoting endophyte *Rhizobium* sp. Strain IRBG74. *Genome Announ.* doi: 10.1128/genomeA.00934-13.
9. Das S, Singh S, Forst S, McClelland M and **Gyaneshwar P**. (2013). Characterization of an acid-inducible sulfatase in *Salmonella enterica* serovar Typhimurium. *Appl. Environ. Microbiol.* 79: 2092-2095.
10. **Gyaneshwar P**, Hirsch AM, Moulin, L., Chen WM, Elliott GN, Bontemps C, Estrada-de los Santos P, Gross E, dos Reis Junior FB, Sprent JI, Young JPW, and James EK. (2011). Legume nodulating betaproteobacteria: diversity, host-range and future prospects. *Mol. Plant-Microbe Interact.* 24: 1276-1288.
11. Sugawara M, Shah GR, Sadowsky MJ, Paliy O, Speck J, Vail AW, and **Gyaneshwar P**. (2011). Expression and functional roles of *Bradyrhizobium japonicum* genes involved in the utilization of inorganic and organic sulfur compounds in free-living and symbiotic conditions. *Mol. Plant-Microbe Interact.* 24: 451-457.
12. Cummings SP, **Gyaneshwar P**, Andrews M, Huphry D, Elliot GN, Nelson A, Orr C, Pettitt D, Santos S, Krishnan HB, Vinuesa P, Odee D, Young PJ and James

- EK (2009). *Rhizobium (Agrobacterium) radiobacter* strain IRBG74 can effectively nodulate several species of *Sesbania*. *Environ. Microbiol* 11:2510-25.
13. Loh KD, **Gyaneshwar P**, Papadimitriou EM, Fong R, Kim KS, Zhou Z, Inwood W and Kustu S (2006). A new pathway for pyrimidine catabolism. *Proc. Natl. Acad. Sci. USA* 103: 5114-5119.
  14. **Gyaneshwar P**, Paliy O, McAuliffe J, Popham DL, Jordan MI and Kustu S (2005). Sulfur and nitrogen limitation in *Escherichia coli* K12: specific homeostatic responses. *J. Bacteriol.* 187: 1074-1090.
  15. **Gyaneshwar P**, Paliy O, McAuliffe J, Jones A, Jordan MI and Kustu S (2005). Lessons from *E.coli* genes similarly regulated in response to sulfur or nitrogen limitation. *Proc. Natl. Acad. Sci. USA* 102: 3453-3458.
  16. Goh EB, Bledsoe PJ, Chen LL, **Gyaneshwar P**, Stewart V, Igo MM (2005). Hierarchical Control of Anaerobic Gene Expression in *Escherichia coli* K-12: the Nitrate-Responsive NarX-NarL Regulatory System Represses Synthesis of the Fumarate-Responsive DcuS-DcuR Regulatory System. *J. Bacteriol.* 187: 4890-4899.
  17. Zimmer D, Paliy O, Thomas B, **Gyaneshwar P**, Kustu S (2004). Genome image programs: visualization and interpretation of *Escherichia coli* microarray experiments. *Genetics* 167: 2111-2119.
  18. Loyd L, Jones S, Jovanovic G, **Gyaneshwar P**, Rolfe M, Thompson A, Buck M (2004). Identification of a new member of the phage shock protein response in *Escherichia coli*, the phage shock protein G (PspG). *J. Biol. Chem.* 279: 55707-55714.
  19. Soupene E, vanHeeswijk WC, Plumbridge J, Stewart V, Bertenthal D, Lee H, **Gyaneshwar P**, Paliy O, Charennoppakul P & Kustu S (2003). Physiological studies of *Escherichia coli* strain MG1655: growth defects and apparent cross-regulation of gene expression. *J. Bacteriol.* 185: 5611-5626.
  20. **Gyaneshwar P**, Naresh Kumar G, Parekh LJ & Poole PS (2002). Role of soil microorganisms in improving P nutrition of plants. *Plant Soil* 245: 83-93.
  21. **Gyaneshwar P**, James EK, Reddy PM, & Ladha JK (2002). *Herbaspirillum* colonization increases growth and nitrogen accumulation in aluminum-tolerant rice varieties. *New phytol.* 154: 131-146.
  22. James EK, **Gyaneshwar P**, Mathan N, Barraquio WL, Olivares FL & Ladha JK (2002). Infection and colonization of rice seedlings by the plant growth promoting bacterium *Herbaspirillum seropedicae* Z67. *Mol. Plant Microbe Interact.* 15: 894-906.
  23. Peng S, Biswas JC, Ladha JK, **Gyaneshwar P** & Chen Y (2002). Influence of rhizobial inoculation on photosynthesis and grain yield of rice. *Agron. J.* 94: 925-929.
  24. **Gyaneshwar P**, James EK, Mathan N, Reddy PM, Reinhold-Hurek B & Ladha JK (2001). Endophytic colonization of rice by a diazotrophic strain of *Serratia marcescens*. *J. Bacteriol.* 183: 2634-2645.

25. Tan Z, Hurek T, **Gyaneshwar P**, Ladha JK & Reinhold-Hurek B (2001). Novel endophytes of rice form a taxonomically distinct subgroup of *Serratia marcescens*. *Syst. Appl. Microbiol.* 24: 245-251.
26. **Gyaneshwar P**, Reddy PM & Ladha JK (2000). Nutrient amendments affect colonization of rice by endophytic strains of *Serratia marcescens* IRBG500 and *Herbaspirillum seropedicae* Z67. *J. Microbiol. Biotechnol.* 10: 694-699.
27. Saxena SS, Ladha JK, **Gyaneshwar P**, Reinhold-Hurek B, Hernandez RJ & Biswas JC (2000). Evaluation of *lacZ* and *gus A* markers to study rhizobial colonization in rice roots. *Indian J. Microbiol.* 40: 15-20.
28. **Gyaneshwar P**, Parekh LJ, Archana G, Poole PS, Hutson RA, Collins MA & Naresh Kumar G (1999). Involvement of phosphate starvation induced glucose dehydrogenase in soil P solubilization by *Enterobacter asburiae*. *FEMS Microbiol. Lett.* 171: 223-229.
29. **Gyaneshwar P**, Naresh Kumar G & Parekh LJ (1998). Effect of buffering on the P solubilizing abilities of microorganisms. *World J. Microbiol. Biotechnol.* 14: 669-673.
30. **Gyaneshwar P**, Naresh Kumar G & Parekh LJ (1998). Cloning of mineral phosphate solubilizing genes from *Synechocystis* PCC 6803. *Curr. Sci.* 74: 1097-1099.

### **Book Chapters**

1. Raturi A, **Gyaneshwar P**, Singh SK, Tak N, Gehlot HS (2012). Bacterial endophytes and their significance in the sustainable production of food in non-legumes. Climate change and abiotic stress tolerance. Tuteja N (ed). Wiley-VCH Verlag GmbH & Co., Weinheim, Germany pp.1013-1040.
2. James EK, **Gyaneshwar P**, Olivares FL, Andrews M (2004). N<sub>2</sub> fixation by non-legumes: the potential of associative and endophytic N<sub>2</sub> fixation in agricultural systems. *Aspects of Applied Biology.* 72: 125-129.
3. **Gyaneshwar P**, Naresh Kumar G, Parekh LJ & Poole PS (2003). In: *Food Security in Nutrient-Stressed Environments: Exploiting Plant's Genetic Capabilities*. Adugyamfi JJ (ed). Dev. Plant Soil Sci 95: . Kluwer Academic Publishers, The Netherlands. (Invited Review)
4. Hurek T, Tan Z, Mathan N, Egener T, Engelhard M, **Gyaneshwar P**, Ladha JK & Reinhold-Hurek B (2000). In: *The Quest for Nitrogen Fixation in Rice*. Ladha JK & PM Reddy (eds.), International Rice Research Institute, Manila, Philippines pp. 47-62.
5. **Gyaneshwar P**, Naresh Kumar G & Parekh LJ (1998). In: *Biofertilizers and Biopesticides*. Deshmukh, A. M (ed). Technoscience Publishers, Jaipur, India. (Invited Review).
6. James EK, **Gyaneshwar P**, Barraquio WL, Mathan N & Ladha JK (2000). In: *The Quest for Nitrogen Fixation in Rice*. Ladha JK & PM Reddy (eds.), International Rice Research Institute, Manila, Philippines pp. 119-140. (Invited Review).

## **Research Funding**

### Extramural grants

- 2022-2024      **Wisconsin Sea Grant.** Mechanisms and management of *E. coli* accumulation in beach sand. (Co-PI) US\$10,000.
- 2015-2019      **National Science Foundation.** Elucidating rhizobial interactions and the possibility of symbiotic nitrogen in the non-nodulating legume *Gleditsia triacanthos* L. US\$ 292,133.
- 2013-2016      **National Science Foundation.** Understanding and utilizing a unique association between rhizobia and rice. US\$360,740.

### Competitive grants from UW Milwaukee

- 2022-2024      **Discovery and Innovation Grant.** Characterizing Nod factor independent symbiosis between *Mimosa pudica* and beta-rhizobia. US\$116,898.
- 2017-2019      **Research Growth Initiative.** Understanding the mechanism of rice colonization by *Rhizobium* sp. IRBG74 and enhancing its potential for rice growth promotion. US\$135,000.
- 2009-2010      **Research Growth Initiative.** Functional and ecological genomics of sulfonate utilization by soybean nodulating *Bradyrhizobium japonicum*. US\$98,400.

## **Intellectual property**

Invention Disclosure to UWM Research Foundation:

- Characterizing Sulfatase in *Salmonella* for development as drug targets and markers for food contamination.
- Thiamine transporters as alternative drug targets to inhibit biofilm formation.

## **Other Professional Activities**

2016-present      Editorial board *Symbiosis*

210-present	Ad-Hoc reviewer for scientific journals ( <i>Mol. Plant Microbe Interact</i> ; <i>Appl. Environ. Microbiol</i> ; <i>Environ. Microbiol.</i> ; <i>Plant Soil</i> ; <i>PLOS One</i> )
2022	Member, Scientific Advisory Board (25 <sup>th</sup> North American Symbiotic Nitrogen Fixation Conference, Madison, WI, USA)
2010-2016	Editorial board <i>Biology and Fertility of Soils</i>
2015	Ad-Hoc reviewer NSF grant proposal
2012	Pre-proposal review panel member, NSF