GYANESHWAR PRASAD (aka GP)
Professor and Chair
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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

1992-1998	Ph.D (Biochemistry) Maharaja Sayajirao University of Baroda-India (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 Thesis: Phytochorome regulation of isocitrate lyase in germinating cucumber seedlings; Professor Srivastava
1985-1988	B.Sc (Botany, Zoology, Chemistry) Osmania University Hyderabad-India

Academic Appointments

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 *Supervisor: Dr. Arkady Khodursky*
2003-2004	Associate Specialist, University of California, Berkeley *Supervisor: Professor Sydney Kustu (National Academy Member)*
2000-2003	Post-Doctoral Fellow, University of California, Berkeley *Supervisor: Professor Sydney Kustu (National Academy Member)*

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 mangers 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 Chamaecristra 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 PureSinse 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 *Paraburkohlderia phymatum*. 28th North American Symbiotic Nitrogen Fixation Conference, University of Wisconsin Madison. June 5-8.

Welmillage S, Gyaneshwar P (2021). The effect if mineral nitrogen on symbiosis between *Mimosa pudica* and *Paraburkholderia phymatum*. ASM North Central Brach 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*. 7th Annual Student Research Symposium. November 9th. Riveredge Nature Center, Saukville, WI.

Hess K and Gyaneshwar P (2019). Characterizing symbiotic interactions between *Rhizobium* sp. IRBG74 and *Sesbania* in aquatic conditions. November 9th. 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. 7th Annual Student Research Symposium. November 10th. Riveredge Nature Center, Saukville, WI.

Ketelboeter LM, Zawada Z, Sreevidya VS, James EK, Gyaneshwar P (2018). Do nodulating and non-nodulating primitive (Caesalpinioid) legumes share nitrogen-fixing symbionts? 24th 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 (Caesalpinioid) 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. 23rd 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. 19th 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 β-proteobacteria (as compared to the well-studied α-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

https://scholar.google.com/citations?user=hMJL0fsAAAAJ&hl=en&oi=ao

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^{T}. *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_2 fixation by non-legumes: the potential of associative and endophytic N_2 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 *Symbosis*

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