Parag R. Chitnis

Associate Director for Programs, National Institute of Food and Agriculture, USDA,

Education

Ph.D.	Biology	1987	University of California at Los Angeles, CA
M.Sc.	Genetics/Biochemistry	1984	Indian Agricultural Research Institute, New Delhi, India
B.Sc.	Botany	1982	Konkan Agricultural University, Dapoli, India

Experience

Science Administration

May 2019-
Oct 2019-Sept 2021 — Associate Director for Programs
Acting Associate Director for Operations — National Institute of Food and Agriculture, USDA, Washington, DC and Kansas City, MO

Responsibilities- management of research, education, and extension programs with total budget of $1.9 billion (in FY21) and leadership of program staff in four program institutes that include ten divisions.

Major **accomplishments-**

- Successfully established NIFA's operations in Kansas City after the relocation of its 300 positions from Washington DC on Sept 29, 2019.
- Led hiring of ~260 new staff members at all levels since NIFA's relocation in 2019
- Enhanced the agency efficiency and customer service in implementing its programs through process improvements using stakeholder feedback
- Aligned NIFA programs with national priorities, including climate change and equity; NIFA budget increased by 12% in FY21 over FY20.
- Representing NIFA in OSTP's Machine Learning and Artificial Intelligence subcommittee, resulting in NIFA's $40 million investments in AI Institutes each year in FY 20 and FY 21.
- Addressed needs of University research communities during COVID-19 pandemic by providing policy flexibilities and by creating new funding opportunities
- Enhanced competitive funding opportunities for Extension and outreach by facilitating creation of programs within AFRI that are appropriate for Extension priorities and programming. Examples include- COVID-19 related extension and outreach efforts, non-formal education (4-H) content projects, and support for amplifying climate education through collaboration with USDA Climate Hubs.

July 2020- Jan 2021 — Acting Director — National Institute of Food and Agriculture, USDA, Washington, DC and Kansas City, MO

NIFA's Director is a political appointee. While serving as the acting Director between two political appointees, I was responsible for stakeholder interactions and leadership of the entire agency (~300 positions).

Sept 2014-
May 2019 — Deputy Director for Food Production & Sustainability — National Institute of Food and Agriculture, USDA, Washington, DC

Responsibilities- leadership of programs with a budget of over $800M and of ~75 FTEs

Accomplishments-

- Development of a vision for catalyzing science frontiers and connections, innovating processes, and listening to stakeholders, resulting in increased budget (by over $70M annually) managed by Institute of Food Production and Sustainability
- Led new interdisciplinary science initiatives at NIFA, including
  - A data science initiative for agriculture that invested >$20M annually in research projects since FY19.
  - A transdisciplinary program on Sustainable Agricultural Systems that promotes data-driven systems approaches to tackle grand challenges in agriculture, investing ~$300M during FY2018-21 period
  - Interagency collaborations in robotics, cyber-physical systems, data science, infectious diseases, etc.
- Led Agriculture and Food Research Initiative, the flagship competitive program of NIFA, created an efficient coordination strategy, developed budgets, and improved the program performance, resulting in budget increase
- Designed and implemented NIFA Listens initiative for systematic stakeholder input, analysis, and implementation

2011-2014	Division Director	Division of Molecular and Cellular Biosciences, National Science Foundation, Arlington, VA
2007-2011	Deputy Division Director	Division of Molecular and Cellular Biosciences, National Science Foundation, Arlington, VA

- Led Division ($125M budget with ~30 FTEs) to develop vision and define and market the MCB brand, resulting in 46% increase in budget invested in MCB-projects
- Innovative processes for development of research ideas such as:
  - Sandpit/Ideas Lab to generate transformative ideas using facilitated creativity- MCB led four Ideas Labs on- synthetic biology, biological imaging, photosynthesis, and nitrogen.
  - Big Pitch pilot to identify transformative ideas from synopses of proposals (see news and analysis in Science, “NSF's ‘Big Pitch’ Tests Anonymized Grant Reviews”, 2012,336 pp.969-970
- Received NSF Director’s Meritorious Service Award for Leadership Excellence (2014), NSF Director’s Award for Management Excellence (2008), and NSF Director’s Equal Opportunity Achievement Award (2007)

2002-2007	Program Director	Division of Molecular and Cellular Biosciences, National Science Foundation, Arlington, VA

Academic Positions

2000-2002	Professor	Department of Biochemistry, Biophysics and Molecular Biology, College of Agriculture, Iowa State University, Ames, IA
1996-2000	Associate Professor	Department of Biochemistry, Biophysics and Molecular Biology, College of Agriculture, Iowa State University, Ames, IA
1991-1996	Assistant Professor	Division of Biology and Kansas Ag Expt. Station, Kansas State University, Manhattan, KS

Academic **accomplishments** include:

- Advanced in academic career to Professor of Biochemistry within 9 years since first tenure-track position
- Mentored >25 undergraduate students, 6 MS students, 7 PhD students, 8 post-

doctoral fellows

- Participation and leadership roles in interdepartmental graduate programs in Bioinformatics and Computational Biology, Genetics, Plant Physiology, and Microbiology.
- Publications- >110 publications in diverse journals such as J. Biological Chemistry, Biochemistry, J. Physical Chem. Biophysical J., Plant Physiology, and PNAS. With h-index of 39 and i10 index of 68, my publications are continued to be cited by 106-290 other publications in every year since 1992 to 2017.
- Served as a reviewer for grant panels at NSF, USDA, and NIH
- Research funding from NSF, USDA, NIH, BARD, NASA, Pioneer HiBred, Iowa Corn Promotion Board.
- Training Grants from NSF and NIFA, including IGERT in Bioinformatics and Computational Biology and REU site in molecular biotechnology
- Educational grants from NSF and HHMI for developing experience-based learning and other educational innovations
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Spring 1999	Visiting Scientist, Australian Proteome Analysis Facility, Macquire Univeristy, Sidney, Australia	
Spring 1998	Visiting Professor, Instituto de Bioquímica Vegetal y Fotosíntesis, Universidad de Sevilla, Sevilla, Spain	
Summer 1998	Visiting Scientist, Service de Bioénergétique, CEA-Saclay, Gif-sur-Yvette, France	
Summer 1997	Visiting Professor, Technische Universität Berlin and University of Münster, Germany	
1989-1991	Research Associate	Roche Institute of Molecular Biology, Nutley, NJ, USA
1987-1989	Post-doctoral Fellow	Roche Institute of Molecular Biology, Nutley, NJ, USA

Activities and Accomplishments

Administration and Leadership Experience

My experience as a research administrator includes leadership positions at two major Federal science agencies as Associate Director and Deputy Director of National Institute of Food and Agriculture, USDA (2014-) and as Division Director, Deputy Division Director, and Program Director at National Science Foundation (2002-2014).

Managing Complex Science Portfolios

- Led science grant programs on increasing budgets and complexity:
    - As a program director at NSF, I led programs in Biomolecular Systems Cluster which reviewed over 400 proposals in a year and managed approximately 200 active awards using $40M in funds (Received NSF ***Director's Award for Program Management Excellence (2006))***
    - As the deputy director and director of the Division of Molecular and Cellular Biosciences (MCB), I was responsible for ~30 staff members and ~$125M annual budget for research grants
    - As the Deputy Director for Food Production and Sustainability at NIFA, I led four divisions that ~$1B annual budget for research, extension, and education as well as for managing a portfolio of ~$700M projects in Sustainable Agricultural Production Systems
    - Currently, I lead and manage NIFA's 70+ programs (in FY21) with a budget of $1.95B in FY21and operations that result in ~3500 grants, to academic institutions, small businesses, NGOs, etc.
- Implementing legislative provisions and new programs
    - Led a team to develop ideas for the 2018 Farm Bill and their implementation after its passage
    - Provided extensive technical information to the staffers of the House and Senate agriculture committee through documents and discussions, resulting ultimately in positive outlook on the NIFA programs and their support to the increase in NIFA's budget (e.g. increase in AFRI budget from $325M to $435M over six years or increase in the Organic agriculture and extension initiative from $20 million to $50 million)
- Innovative processes for generating new ideas
    - At NIFA, supported innovative activities, such as distributed panel review, to improve efficiency, quality, and integrity of the peer review process at NIFA
    - Planning and implementing 'big pitch' pilots for innovative idea review
    - Planning and implementing ideas labs for deliberate creativity-based idea generation, resulting in several projects that were highly risky, but highly creative and potentially transformative in the areas of synthetic biology, photosynthesis, nitrogen fixation, and biological image processing.
- Development of research policies and ensuring compliance
    - Represented NSF in development of biosecurity policies on the US Government committees for
        - security regulations about synthetic DNAs and synthetic biology
        - dual use research of concern policy
    - Developed prudent approach to implement dual use research of concern policy at NSF
    - Responsible for implementation of federal financial assistance as well as other research policies at NIFA
    - Led plans for proactive financial compliance reviews of grantee institutions at NIFA

Leading People

- Led increasing number of people
    - At NSF as a Senior Executive Service member of the Division leadership (deputy director or division director), I was responsible for supervising 16 program directors, one program support manager, one operations specialist, one Einstein Fellow, one AAAS fellow, summer interns (typically 3)
    - As the Deputy Director for Food Production and Sustainability at NIFA, I led four divisions that have ~70 positions. I supervised four division directors, four administrative staff members, and three AAAS fellows.
    - Currently, I supervise four Senior Executive Service positions, and two staff office directors, ultimately responsible for ~200 positions at NIFA as the Associate Director of Programs.
- Developing vision for the organizations

- For the Division of Molecular and Cellular Biosciences, the vision was developed around its strength in supporting interdisciplinary research. This branding helped the Division to increase its budget.
- For Institute of Food Production and Sustainability, the institute focused on listening to stakeholders and staff, catalyzing science frontiers and connections, and innovating processes and policies, Improved staff morale and employee engagement in IFPS by 10-12% increase in the employee in Federal Employee Viewpoint Survey, which had the best scores among all NIFA units.
- For NIFA after relocation, initial activities focused on finding common values that brought the new staff together. Together, they focus on commitment to public service and enhanced processes and responsiveness to serve applicants and beneficiaries of NIFA's grants. Now the activities focus on developing the new work culture while rebuilding NIFA at its new location in Kansas City

Business Acumen

- Led relocation and rebuilding of NIFA in Kansas City through collaborative and strategic hiring as well as process management during the times of severe staffing constraints
- Leadership of Project Café, NIFA's process improvement initiative that is rooted in extensive stakeholder feedback on how to improve NIFA's operations
- Budget planning and monitoring for grants programs at both NSF and NIFA.
  - Staffing structure and transition- changed to facilitate transfer of administrative work from program directors to administrative staff, consequently decreasing personnel costs and staff developmental opportunities
  - Leveraging and financial management- led division in many collaborative activities that resulted in leveraging of funds to support the research of interest

Catalyzing Interdisciplinary Science Frontiers

- At NSF, inspired, led, and implemented many research programs to facilitate research at the interface of different disciplines
  - Chemistry- A joint program director appointment, a joint review panel with the Division of Chemistry
  - Physics- A joint review panel; co-funding of three centers on various aspects of biological physics with Division of Physics
  - Engineering- A joint panel and (potentially) a joint program director appointment with Division of Chemical, Biological, Environmental and Transport Engineering
- Chair, NSF's Frontiers in Integrative Biological Research (FIBR) Working Group (2006-2007) Member, Frontiers in Integrative Biological Research Working Group (2001-2005)

  FIBR was the flagship program of the Directorate for Biological Sciences from 2001-2007; This program supported large projects that address major biological questions using integrative and interdisciplinary approaches.
  Member of the group that developed the concept paper and wrote solicitation for the program Co-managed review and award administration of proposals
  Led planning for the distributed management of the program during the phase-out of the program
  Team received NSF Director's Award for Collaborative Integration (2003)
- Member, Arabidopsis 2010 Working Group (2000-2007)
  Senior Management Liaison, Arabidopsis 2010 Working Group (2008-2010)

  Co-managed the competition; the only member with continuous service during 10 years of the program Managed ~40% of 2010 grants in MCB and resource grants in DBI
  Received NSF Director's Award for Collaborative Integration to the Arabidopsis 2010 working group (2004)
  Led the planning for the transition of the 2010 Project to the core programs
  Coordinated planning for the future research directions by the Arabidopsis community
  NSF contact for cooperation between NSF-Deutsche Forschungsgemeinschaft (DFG, the German Research Foundation equivalent to US NSF) on Arabidopsis Functional Genomics
  Coordinated interactions between two funding agencies
  Led organization of two NSF-DFG joint competitions in 2004 and 2007

- BIO-MaPS (Intersection of biology and Physical and mathematical sciences and engineering) Coordinator, (2011-14)
  Co-led with Dr. Denise Caldwell, DDD, PHY and Drs. McGrath/Lighty, DD, Chemical, biological, environment and transport engineering) BIO-MaPS working group
  Co-led FY12-15 budget planning and execution, with ~ $100M additional funds over three years
- At NIFA, led development and implementation of several interdisciplinary programs
  - Food and Agriculture Cyberinformatics Initiative of NIFA, resulting in the funding of $40M since FY2018
  - Led NIFA's investments in AI Initiative through AI Institutes and AI-driven agricultural innovations.

Innovation and Economic Development

- Led implementation of Commodity Board provision in the Farm Bill, resulting in leveraging of NIFA funds by obtaining funds from commodity boards (>10M committed in the first three years of implementation. Team received NIFA Director's Award
- Interactions with private Foundations, NGOs and industrial organizations about common interests and priorities, resulting in joint activities and aligned investments
- Responsible for implementation of USDA's SBIR program as well as NIFA's rural development programs
- Serve on the board on Kansas City Animal Health Corridor, catalyzing USDA-industry interactions
- Initiated and implemented programs for economic development and recovery during the COVID-19 pandemic
- Served on expert panels of Council on Competitiveness, which represents CEOs, Universities, and National Labs for shaping policies and programs to jump-start productivity and grow America's economy
- Led investments in several public-private partnerships such as Citrus Greening project (with Citrus Mutual of Florida and Bayer), Wheat Innovation Hub at K-State (Kansas Wheat Commission and several seed or milling companies), and AI Institutes (collaborations with cloud computing and information technology companies).

Building Coalitions

- Communication with the scientific community, professional societies, and the staffers for the Agriculture committees in US House and Senate
- Co-led stakeholder listening activity of NIFA, resulting in several hundred stakeholder ideas about their needs and the scientific opportunities
- Partnership with Land-Grant Universities
  - As a liaison to the Agricultural Experiment Stations and Cooperative Extension Services in the North-central USA, provided NIFA updates and solved specific problems
  - As a liaison to Experiment Station Committee on Programs of Association of Public and Land Grant Universities (APLU), served as a conduit of information and advice
  - As a NIFA representative in the Deferred Maintenance Working Group of APLU's Board on Agriculture Assembly, contributed to the recommendations and incorporated them in internal USDA deliberations
- Global Leadership in joint programs with funding agencies in other countries
  - International Wheat Yield Program (NIFA, USAID, BBSRC, and others)- $15M from NIFA
  - Collaborative activities with BBSRC in animal and plant health (~$6M from NIFA)
  - Collaboration with Irish science agencies in various animal and plant programs at NIFA
  - Yeast Synthetic Genome Project- built coalition of funding agencies from USA (NSF), China (MoST), UK (BBSRC), and India (CISR and DBT) to fund coordinated synthesis of entire genome of yeast
  - International Arabidopsis Informatics Consortium- Inspired and funded to design the next generation of informatics infrastructure for Arabidopsis research at NSF. BBSRC and DFG involved.
- Collaborations with other funding agencies
  - Collaborations with NSF directorates in National Robotics Initiative, Cyberphysical Systems, high throughput phenotyping, plant biotic interactions and Ecology and Evolution of Infectious Diseases
  - Collaborations with NIH on dual purpose research
  - Catalyzed interactions with ARPA-E and DARPA in topics of agricultural interest (such as plant phenotyping)

Diversity and Inclusion

- As a Chair, **Broadening Participation** Working Group in Directorate for Biological Sciences, NSF (2005-2007) and the Senior Management Liaison to the Broadening Participation Working Group (2008-2011)
  Developed and implemented a strategic plan for broadening participation of underrepresented minorities in biology research
  As the chair of the working group, led the team in the management and monitoring of the distributed review of the proposals submitted to 'Research Initiation Grants and Career Advancement Awards (RIG-CAA) to broaden participation in biological sciences'
  Coordinated the Quality Education for Minorities Grantsmanship Workshops in Biological Sciences
  Team received NSF Director's Equal Opportunity Achievement Award (2007)
- At NSF, worked with professional societies in cell and molecular biosciences to develop collaborative activities and **mentoring networks** for minority scientists
- At NIFA, I continued my passion for equity and inclusion in the research programs by leading and fostering targeted outreach to MSIs. As a mentor to an AAAS fellow, who is now a Dean at North Carolina A and T University, MSI funding data was analyzed to identify strategies for increasing participation of MSIs in NIFA's programs. Under my leadership, increasing diversity is one of the top goals for NIFA in FY21.
- As the Associate Director at NIFA, I am responsible for implementation of an increasing number of programs targeted towards serving minority-serving institutions. As such, I have developed strong interactions and trust with the MSI, particularly the 1890 institutions. New program implemented in the last two years include:
  - New Beginnings for Tribal Students
  - 1890 Centers of Excellence Program
  - 1890 Scholarship Program
  - HBCU Agricultural Business Center Program

Team Activities at NIFA and NSF

Interagency Working Groups

USDA Representative, National Science and Technology Committee- Subcommittee on Machine Learning and Artificial Intelligence (2018-)
  Interagency discussions resulting in the Executive Order on AI as well as AI inclusion in the President's budget request
USDA Representative, National Science and Technology Committee- Subcommittee on Technology (2014-18)
  Interagency strategies on emerging technologies and commercialization
NIFA Representative, Deferred Maintenance Working group- APLU-Board on Agriculture Assembly (2016-17)
  Developed plans on addressing infrastructure needs due to deferred maintenance in agricultural colleges
Member (alternate NSF representative), Interagency Testing Committee (2005-2007)
  Attended meetings with or in place of the NSF representative Participated in the retreat discussing the future plans for the committee
Member, Interagency Metabolic Engineering Working Group (2003-2007)
  Attended committee meetings to discuss the future directions for the program
Member (NSF representative), Sub-PCC (Policy Coordinating Committee) on Synthetic Biology, Homeland Security Biotechnology Committee (2008-2014)
  Policy development on security regulations about synthetic DNAs and synthetic biology
Member (NSF representative), National Science Advisory Board on Biosecurity (2009-2014)
  Represented NSF in the deliberations and policy development
Member (NSF representative), Nanoscale Science, Engineering and Technology (NSET) (2009-2014)
  Represented NSF for biological perspectives for nanosciences
  Coordinated biological nanosciences activities for NNI reports and other data calls

Education Experience

Educational Activities and Accomplishments

- Taught diverse array of courses at Iowa State University and Kansas State University - introductory biology for entering undergraduate students, microbial genetics for advanced microbiology majors, molecular genetics laboratory for the advanced biology majors, biochemistry for non-majors, metabolic biochemistry for entering graduate students, membrane biochemistry for the advanced graduate students
- At Kansas State University
    - As the Principal Investigator of a Course, Curriculum, and Laboratory Improvement grant from NSF, developed an enquiry based molecular biology laboratory course
    - As a participant in the HHMI undergraduate education grant, worked as a mentor for undergraduate students and as a developer of educational activities
- At Iowa State University
    - As the Project Director of an award for supporting a REU (Research Experience for Undergraduates) site, led recruitment and implementation of undergraduate summer research program
    - As the Chair of Diversity Committee of College of Agriculture at ISU, directed development of a strategic plan for enhancing diversity in the college
    - As an Associate Chair of the Interdepartmental Genetics Program at ISU, developed graduate student recruitment strategies
    - Founding member of the Bioinformatics and Computational Biology Program at ISU and an IGERT grant from NSF
    - Co-advised a graduate student in Biology Education
    - Committee Service
        - Chair, Curriculum Committee, Department of Biochemistry and Biophysics
        - Chair, Recruitment Committee, Interdepartmental Graduate program in Genetics
        - Chair, Diversity Committee, College of Agriculture, Iowa State University
- Member of the Graduate Programs in
    - Biochemistry
    - Plant Physiology and Molecular Biology
    - Genetics
    - Bioinformatics and Computational Biology (founding member)
- Member of the Education and Professional Development Committee of American Society of Biochemistry and Molecular Biology (2005-2011)

Educational Funding

HHMI Educational Grant at Kansas State University (Participant)

- Developed a microbial genetics course as a participant in this grant

National Science Foundation (PI)

- As the Principle Investigator of a Course, Curriculum, and Laboratory Improvement (CCLI) grant, led development and implementation of an enquiry-based laboratory course in molecular genetics
- As the founding PI of an REU site at Iowa State University, I obtained funding from NSF, recruited 10 underrepresented and underserved students every summer, and led the group of participating faculty members in providing meaningful summer experiences for the students.

Training Activities

Undergraduate students

- Provided opportunities for research experience for over 25 undergraduate students in 11 years during academic year and summer
- Seven of these undergraduate students are authors on research publications
- Most of the students went to graduate schools or professional schools

Graduate Students

- Served as the major advisor for six MS students and seven PhD students
- Six of these students are currently working in industry, two have research positions in universities, and five have faculty positions in universities.

Post-doctoral associates

- Served as the major advisor for eight post-doctoral fellows
- Five post-docs are currently working in industry; three have faculty positions in universities.

Research Experience

Research Funding

Plant Biochemistry, Photosynthesis, and Proteomics research was supported by research grants (over $4 M) from many federal and private sources.

National Science Foundation (1992-2002) Mutational Analysis of Photosystem I Function
National Institutes of Health (1995-2000) Structure of a Membrane-protein Complex
USDA-CSREES (1992-2000) Reducing side of Photosystem I
USDA-CSREES (2000-2002) Proteomic analysis of cyanobacterial photosynthetic membranes
US-Israel BARD (1993-1997) Structure and function of hsp70 from plant chloroplasts
Iowa Corn Growers Association (1997-2001) Cold tolerance markers in corn
Pioneer Hibred (1999-2002) Homologous recombination in corn

In addition, I received institutional support in the following grants:

- NASA NSCORT grant to Kansas State University for Gravitational Biology research
- USDA regional research project on 'Regulation of Photosynthesis' (through Kansas Agricultural Experiment Station and Iowa Agricultural Experiment Station)
- Iowa Agricultural Experiment Station Hatch Funds

Research Presentations

Invited research presentations at

- 24 foreign universities
- 43 US universities
- 52 regional, national, and international conferences
- 42 technical assistance and agency update presentations at APLU and university meetings

Recent Examples of Invited Symposium and Keynote Speeches

2020 "**NIFA's Transformation and Science Directions**" University of Missouri, Columbia
"**NIFA and Plant Breeding**" National Association of Plant Breeders Annual Meeting, Lincoln, NE

2019 "**Plant Breeding for Food Safety**" University of California, Davis
"**Changing Face of American Agriculture-Global Challenges and Local Opportunities**" Fresno State University, Fresno, CA
"**Changing Face of American Agriculture- Big Data and Smart Technologies**" University of Georgia, Athens
"**Data Science and AI in agriculture**" Indian Institute of Technology, Mumbai, India

2018 "**Data-driven innovations in Agriculture**" International Conference on Biological Ontologies, Corvallis, Oregon
"**Goat Production as a Strategic Opportunity for Small Farmers**" National Goat Conference, Montgomery, Alabama
"**Changing Face of Agriculture- Preparing Students for Future Jobs**" Institute of Biological Engineers Conference of Education for Convergence, Norfolk, VA
"Food and Agriculture Cyberinformatics and Tools: NIFA's Initiative for Data Science in Agriculture" Iowa State University Workshop on Big Data for (Sm)all Farmers, Ames, IA

"**Food and Agriculture Cyberinformatics and Tools: Opportunities for Phenomics"** Iowa State University, Ames, IA

2017 **"Future Opportunities for Grape Research"** NWGI workshop on Vision for Grape Research, Portland, OR
"Information and Communication Technologies for Transforming Food and Agricultural Systems" International Bioeconomy Forum, Washington, DC
"Data Science for Transforming Food and Agricultural Systems" Oracle Corporation, Reston, VA
"Food and Agricultural Systems of the Future: Opportunities for Beginning Farmers and Ranchers" Annual Beginning Farmers Conference, Memphis, TN
"Big Data in Food and Agriculture" ESCOP annual meeting, Philadelphia, PA
"**Advancement of science and technology to achieve global food security and fight hunger"** Institute of Food Technologists Conference, Las Vegas, NV
"**Plant Breeding for Agriculture of the Future**" National Association of Plant Breeders Annual Conference, Davis, CA
"**Metabolic Biochemistry to Synthetic Biology to User-inspired Science**" Gordon Research Conference on Plant Metabolic Engineering, NH
"**User-inspired Science for the Food and Agricultural Enterprise**" University-Industry Consortium Annual Meeting, Baltimore, MD
"**Innovation in Agriculture: NIFA Perspective"** Conference of the Association of Research Directors of 1890 Universities, Atlanta, GA

Research Publications

This selected list represents the diversity of publications among over 110 peer-reviewed or invited articles. (h-index of 41 and i10 index of 69)

Seminal Reviews and Commentaries

Chitnis, PR. A blueprint for advancing agricultural science, Open Access Government. 2021 March; https://www.openaccessgovernment.org/a-blueprint-for-advancing-agricultural-science/105554/
Colón W, Chitnis P, Collins JP, Hicks J, Chan T, and Tornow JS, Chemical biology at the US National Science Foundation, Nature Chemical Biology. 2008 Sept; 4(9):511 – 514.
Chitnis PR. PHOTOSYSTEM I: Function and Physiology. Annu Rev Plant Physiol Plant Mol Biol. 2001 52:593-626.
Chitnis PR and Mohanty P, Guest Editors (2000) Indian Journal of Biochemistry & Biophysics (IJBB), Special Issue on 'Photosynthesis Research in the Post-Genomic Era'
Chitnis PR. Photosystem I. Plant Physiol. 1996 Jul;111(3):661-9.

Structure-function studies in the photosystem I complex

Johnson TW, Shen G, Zybailov B, Kolling D, Reategui R, Beauparlant S, Vassiliev IR, Bryant DA, Jones AD, Golbeck JH, Chitnis PR. Recruitment of a foreign quinone into the A(1) site of photosystem I. I. Genetic and physiological characterization of phylloquinone biosynthetic pathway mutants in Synechocystis sp. pcc 6803. J Biol Chem. 2000 Mar 24;275(12):8523-30.
Sun J, Xu W, Hervás M, Navarro JA, Rosa MA, Chitnis PR. Oxidizing side of the cyanobacterial photosystem I. Evidence for interaction between the electron donor proteins and a luminal surface helix of the PsaB subunit. J Biol Chem. 1999 Jul 2;274(27):19048-54.
Sun J, Xu Q, Chitnis VP, Jin P, Chitnis PR. Topography of the photosystem I core proteins of the cyanobacterium Synechocystis sp. PCC 6803. J Biol Chem. 1997 Aug 29;272(35):21793-802.
Chitnis VP, Jungs YS, Albee L, Golbeck JH, Chitnis PR. Mutational analysis of photosystem I polypeptides. Role of PsaD and the lysyl 106 residue in the reductase activity of the photosystem I. J Biol Chem. 1996 May 17;271(20):11772-80.
Xu Q, Yu L, Chitnis VP, Chitnis PR. Function and organization of photosystem I in a cyanobacterial mutant strain that lacks PsaF and PsaJ subunits. J Biol Chem. 1994 Feb 4;269(5):3205-11.
Chitnis VP, Xu Q, Yu L, Golbeck JH, Nakamoto H, Xie DL, Chitnis PR. Targeted inactivation of the gene psaL encoding a

subunit of photosystem I of the cyanobacterium Synechocystis sp. PCC 6803. J Biol Chem. 1993 Jun 5;268(16):11678-84.

Biophysical analysis of photosynthetic processes by ultrafast, EPR and FTIR spectroscopy

Xu W, Wang Y, Taylor E, Laujac A, Gao L, Savikhin S, Chitnis PR Mutational Analysis of Photosystem I of *Synechocystis* sp. PCC 6803: The Role of Four Conserved Aromatic Residues in the *j*-helix of PsaB**.** PLoS ONE. 2011. 6(9): e24625.
Breton J, Chitnis PR, Pantelidou M. Evidence for hydrogen bond formation to the PsaB chlorophyll of P700 in photosystem I mutants of Synechocystis sp. PCC 6803. Biochemistry. 2005 Apr 12;44(14):5402-8.
Dashdorj N, Xu W, Martinsson P, Chitnis PR, Savikhin S. Electrochromic shift of chlorophyll absorption in photosystem I from Synechocystis sp. PCC 6803: a probe of optical and dielectric properties around the secondary electron acceptor. Biophys J. 2004 May;86(5):3121-30.
Pantelidou M, Chitnis PR, Breton J. FTIR spectroscopy of synechocystis 6803 mutants affected on the hydrogen bonds to the carbonyl groups of the PsaA chlorophyll of P700 supports an extensive delocalization of the charge in P700+. Biochemistry. 2004 Jul 6;43(26):8380-90.
Breton J, Xu W, Diner BA, Chitnis PR. The two histidine axial ligands of the primary electron donor chlorophylls (P700) in photosystem I are similarly perturbed upon P700+ formation.Biochemistry. 2002 Sep 17;41(37): 11200-10.
Hou JM, Boichenko VA, Wang YC, Chitnis PR, Mauzerall D. Thermodynamics of electron transfer in oxygenic photosynthetic reaction centers: a pulsed photoacoustic study of electron transfer in photosystem I reveals a similarity to bacterial reaction centers in both volume change and entropy. Biochemistry. 2001 Jun 19;40(24): 7109-16
S, Xu W, Chitnis PR, Struve WS. Ultrafast primary processes in PS I from Synechocystis sp. PCC 6803: roles of P700 and A(0). Biophys J. 2000 Sep;79(3):1573-86.

Proteomic, Genetic and Metabolic analysis of plants and other systems

Heck DA, Miles D, Chitnis PR. Characterization of two photosynthetic mutants of maize Plant Physiol. 1999 Aug; 120(4):1129-36.
Zhao GP, Somerville RL, Chitnis PR. Synechocystis PCC 6803 contains a single gene for the beta subunit of tryptophan synthase with strong homology to the trpB genes of Arabidopsis and maize (Zea mays L.). Plant Physiol. 1994 Feb;104(2):461-6.
Chen CN, Porubleva L, Shearer G, Svrakic M, Holden LG, Dover JL, Johnston M, Chitnis PR, Kohl DH. Associating protein activities with their genes: rapid identification of a gene encoding a methylglyoxal reductase in the yeast Saccharomyces cerevisiae. Yeast. 2003 Apr 30;20(6):545-54.
Porubleva L, Vander Velden K, Kothari S, Oliver DJ, Chitnis PR. The proteome of maize leaves: use of gene sequences and expressed sequence tag data for identification of proteins with peptide mass fingerprints. Electrophoresis. 2001 May;22(9):1724-38.
Wade Johnson T, Naithani S, Stewart C Jr, Zybailov B, Daniel Jones A, Golbeck JH, Chitnis PR. The menD and menE homologs code for 2-succinyl-6-hydroxyl-2,4-cyclohexadiene-1-carboxylate synthase and O- succinylbenzoic acid-CoA synthase in the phylloquinone biosynthetic pathway of Synechocystis sp. PCC 6803.Biochim Biophys Acta. 2003 Mar 6;1557(1-3):67-76.
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Protein targeting and assembly into multiprotein complexes in bacteria and plants

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