

**ROHIT V. PAPPU**

Gene K. Beare Distinguished Professor of Engineering  
Washington University in St. Louis (WashU)  
Department of Biomedical Engineering in the James F. McKelvey School of Engineering  
One Brookings Drive, Campus Box 1097  
St. Louis, MO 63130-4899  
E-mail: pappu@wustl.edu  
Phone: (314) 935-7958  
Cell phone: (314) 304-0465  
URL: <http://pappulab.wustl.edu/>

**PROFESSIONAL BACKGROUND**

***Academic Positions***

**July 2022 – current:** Director, Center for Biomolecular Condensates (CBC), James McKelvey School of Engineering, Washington University in St. Louis

**September 2021 – current:** Gene K. Beare Distinguished Professor of Engineering, McKelvey School of Engineering, Washington University in St. Louis

**July 2018 – June 2022:** Director, Center for the Science and Engineering of Living Systems (CSELS), James McKelvey School of Engineering, Washington University in St. Louis

**March 2015 – August 2021:** Edwin H. Murty Professor of Engineering, McKelvey School of Engineering, Washington University in St. Louis

**September 2012 – June 2018:** Director, Center for Biological Systems Engineering, School of Engineering & Applied Sciences, Washington University in St. Louis

**January 2013 – January 2018:** Co-Director, Center for High Performance Computing, Washington University in St. Louis

**January 2011 – current:** Professor, Department of Biomedical Engineering, Washington University in St. Louis, School of Engineering & Applied Sciences

**March 2007 – current:** Member, Hope Center for Neurodegenerative Disorders, Washington University School of Medicine

**July 2007 – December 2010:** Associate Professor, Department of Biomedical Engineering, Washington University in St. Louis, School of Engineering & Applied Sciences; Adjunct Associate Professor, Department of Biochemistry & Molecular Biophysics, Washington University School of Medicine

**February 2009 – August 2010:** Director, Center for Computational Biology, Washington University School of Medicine

**May 2002 – August 2010:** Member, Center for Computational Biology, Washington University School of Medicine

**September 2001 – June 2007:** Assistant Professor, Department of Biomedical Engineering, Washington University in St. Louis, School of Engineering & Applied Sciences; Adjunct Assistant Professor, Department of Biochemistry and Molecular Biophysics, Washington University School of Medicine

### ***Non-academic Affiliations***

**January 2019 – January 2021:** Member, Scientific Advisory Board, Dewpoint Therapeutics, Boston, MA and Dresden, Germany

### ***Education and Training***

**Postdoctoral Scientist**, 1998-2001

Department of Biophysics and Biophysical Chemistry, Johns Hopkins University, School of Medicine, Baltimore, MD; Mentor: Professor George D. Rose

**Postdoctoral Scientist**, 1996-1998

Department of Biochemistry and Molecular Biophysics, Washington University in Saint Louis, School of Medicine, St. Louis, MO; Mentor: Professor Jay W. Ponder

**Ph.D.**, Biological Physics, 1992-1996

Department of Physics and Astronomy, Tufts University, Medford, MA  
Advisor: Professor David L. Weaver (deceased)  
Thesis: Algorithms for modeling folding pathways of proteins.

**M.S.**, Solid State Physics, 1990-1992

Department of Physics and Astronomy, Tufts University, Medford, MA

**B.Sc.**, Honors in Physics, Mathematics, and Electronics, 1986-1989

St. Joseph's College, Bangalore University, Bangalore, India

### ***Professional Societies***

Member, American Association for the Advancement of Science (AAAS)

Member, American Chemical Society (ACS)

Member, American Institute of Medical and Biological Engineers (AIMBE)

Member, Biophysical Society (BPS) and subgroups on Intrinsically Disordered Proteins (IDPs) and Biopolymers In Vivo (BIV)

Member, The Protein Society (TPS)

Member, Sigma Xi, The Scientific Honor Society

## **ACTIVE RESEARCH PROGRAM**

### ***Cellular Organization Molecular Biophysics & Bioengineering***

Our research is focused on uncovering the biophysical principles underlying the spatial and temporal organization of cellular matter, its impact on cell physiology and disease, and leveraging fundamental insights for designing novel materials and biomolecular condensates. Our investigations span multiple length scales and involve a collective effort on the biophysical principles pertaining to the form, function, regulation, phase behavior, and evolution of intrinsically disordered proteins, multivalent proteins, and RNA molecules. Our research directly impacts topics of biomedical relevance that include the molecular basis of neurodegeneration, phase transitions that lead to protein and RNA condensates, the biophysics of molecular recognition via soft and disordered interfaces, and the design of responsive, protein-based biomaterials. Our work is driven by a blend of novel multiscale computer simulations, adaptations and developments of polymer physics theories, the physics of active matter and non-equilibrium statistical physics

of living systems. We close the loop with *in vitro* and in cell experiments performed in my lab and through a vibrant network of international collaborations.

**Intrinsically disordered proteins (IDPs):** Over the years, we have uncovered sequence-ensemble relationships of IDPs that connect the information encoded in amino acid sequences to quantitative descriptions of conformational ensembles. These efforts have yielded predictive descriptions and uncovered the rich contributions made by amino acid composition, charge content, and sequence patterning effects to the global sizes, shapes, amplitudes of conformational fluctuations, and context dependent secondary structural preferences within IDPs / IDRs. These discoveries have been made possible through novel combinations of polymer physics theories, accurate and efficient molecular simulations driven by our homegrown ABSINTH implicit solvation model, and biophysical experiments. In ongoing investigations, we are pursuing three new avenues: (1) We are using computationally driven approaches to design novel IDPs / IDRs with bespoke sequence-ensemble relationships to uncover the connections between these relationships and molecular functions. (2) We are developing and deploying new, multiscale computational and theoretical approaches to model circuits controlled by multisite phosphorylation and other multisite post-translational modifications within IDPs. (3) We are deploying new methods to investigate the effects of sequence-specific charge regulation, specifically proton uptake and release phenomena on disorder-order transitions of IDPs / IDRs in cellular milieus. These efforts have led to the development of a novel  $q$ -canonical ensemble for describing conformational and proton binding equilibria. Importantly, our development and deployment of the  $q$ -canonical formalism has paved the way for decoupling measurements of charge from measurements of conformation, thereby allowing us to use these independent measurements and the information they provide as restraints for atomistic simulations. Our approaches are yielding surprising findings regarding the diversity of charge and conformational states that are operative in the functions of IDPs.

**Phase transitions in cell biology:** We are actively working on the problem of phase transitions that are controlled or influenced by multivalent proteins and RNA molecules. These phase transitions include sol-gel transitions as well as liquid-liquid, liquid-solid, and liquid-liquid crystalline phase separation. Our focus is on describing relationships between protein sequences / architectures and the stimulus specific phase diagrams that are governed by spontaneous driving forces also known as passive processes. This focus is driven by the importance of biomolecular condensates that form via phase transitions afford spatiotemporal organization and information transduction within cells. Specific foci include nuclear bodies, stress responses, synaptic bodies, and the interplay between spontaneous and driven processes. The unique approach we are pursuing is based on adaptations of the physics of associative polymers, specifically the *stickers-and-spacers* framework, and introduction of the concept of phase separation++ i.e., accounting for density transitions along with geometric transitions, and symmetry breaking.

**The physics of coarse graining:** Collective phenomena and collective properties are the defining hallmarks of living systems. For example, properties such as interfacial tension or interfacial energies of biomolecular condensates arise from the collective properties of solvent, solutes, and macromolecules and asymmetries of these properties across phase boundaries. Defining, measuring, and interpreting collective properties requires the identification of collective coordinates, and this requires a systematic, bottom-up coarse-graining approach. Our methods, inspired by the force-matching approach of the Voth group, and anchored in the tenets of renormalization group theories, are enabling the development of novel, system or architecture-specific coarse-grained models that have enabled the discoveries and demonstrations of key conceptual aspects of phase separation++. A key advancement has been the development of a

lattice-based engine known as LaSSI that affords the promise of being able to adapt the physics of RG theory to identify flows in interaction space.

**Neurodegeneration:** We work on connecting the driving forces for and the mechanisms of polyglutamine aggregation and phase separation to intracellular interactions that lead to neurodegeneration in HD and other polyglutamine expansion disorders. An emerging focus is on the modulation of aggregation and phase behavior by endogeneous networks of protein-protein interactions.

**Molecular and Cellular Engineering:** We are building on our work pertaining to phase transitions and IDPs to develop, prototype, and deploy computational methods to predict phase behavior from amino acid sequence and advance the design of responsive peptide and protein-based biomaterials. Our design approaches are based on supervised machine learning and adaptation of genetic as well as evolutionary algorithms. Through these efforts, we are expanding the universe of IDPs that demonstrate stimulus responsive phase behaviors.

### **Awards**

Renewed as Mercator Fellow by the Deutsche Forschungsgemeinschaft (DFG), May 2022 – April 2025

Inducted, by election, as a full member of the Sigma Xi Scientific Research Honor Society, January 2020

Recipient of the 2019 McKelvey Engineering Faculty Award for excellence in teaching, Washington University in St. Louis, April 2019

Named as Mercator Fellow by the Deutsche Forschungsgemeinschaft (DFG), May 2019 – April 2022

Elected Fellow of the Biophysical Society, 2019

Dean's Award for Outstanding Contributions in Service of the Mission of the School of Engineering & Applied Sciences, Washington University in St. Louis, April 2017.

Inducted to the College of Fellows of the American Institute for Medical and Biological Engineering (AIMBE), April 2016.

Elected fellow of the American Association for Advancement of Science (AAAS), November 2013.

Basil O'Connor Starter Scholar Award, March of Dimes Research Foundation, 2004

Graduate Biophysics Fellowship, selected to attend Princeton-NEC workshop, June 1996

John F. Burlingame Graduate Research Fellowship, Tufts University, 1995 – 1996

National Merit Scholarship, Bangalore University, Bangalore, India, 1989

### **Honors**

Member, Board of Reviewing Editors for eLife – January 2021 – present

Listed, in 2021, by the Institute of Science as being in the top 1% of researchers worldwide in terms of number of citations

Chair, NIH-MDCN-3(B) Special Emphasis Review Panel, July 2021

Listed, in 2020, by the Institute of Science as being in the top 1% of researchers worldwide in terms of number of citations

Listed, in 2019, by the Institute of Science as being in the top 1% of researchers worldwide in terms of number of citations

Chair of NIH ZRG1-MDCN study section, April 2019

Invited participant and speaker in the Banbury Center meeting on Phase Separated Assemblies in Cell Biology, Cold Spring Harbor Laboratory, December 16-19, 2018

Co-Chair of NIH ZRG1-MDCN study section, July 2018

Member, Scientific Advisory Board at the Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany, term ending December 31, 2021

Chair the 2017 FASEB Summer Research Conference on Molecular Mechanisms and Physiological Consequences of Protein Aggregation

Guest Editor, *Current Opinion in Structural Biology*, 2017

Guest Editor, Special Issue of *Seminars on Cell and Developmental Biology*, 2015

Member, Editorial Advisory Board, *Biophysical Journal*, December 01, 2014 – December 31, 2020

Member, Executive Committee, Protein Folding Consortium, sponsored by the National Science Foundation, Research Coordination Network, September 2014 – current

Member, Editorial Board of *Protein Engineering, Design and Selection*, July 2014 – current

Elected Symposium Co-Chair for the 9<sup>th</sup> Annual Symposium of the Biophysical Society's Intrinsically Disordered Proteins Subgroup, February 2014

Faculty of 1000 Member, Structural Biology: Theory & Simulation Section, April 2013 – August 2016

BMC Biophysics, Editorial Board Member, 2012 – current.

Chair, 2<sup>nd</sup> Gordon Research Conference on Intrinsically Disordered Proteins, 2012

One of Fifteen Scientists Invited by the National Science Foundation to Participate in a Workshop to Discuss the Future and Frontiers of Protein and RNA Biophysics, September 2011

Charter Member, National Institutes of Health Center for Scientific Review, Biophysics of Neural Systems Study Section, June 2008 – June 2012

Member, Protein Folding Consortium, supported by the National Science Foundation, Research Coordination Network, May 2009 – current

Chair, by election, Intrinsically Disordered Proteins Subgroup, Biophysical Society, 2009

Regular Member, National Science Foundation, Molecular & Cellular Biosciences, Biophysics Panel, April 2008 – Current

### ***Named / Keynote Lectures and Webinars***

Mercator Fellow Keynote Lecture, *Retreat of the DFG Priority Program on Phase Separation*, (SPP2191), April 2023.

Undergraduate student invited colloquium speaker, University of Pennsylvania, Department of Chemistry, November 30, 2022.

Graduate student invited colloquium speaker, Harvard University, Department of Bioengineering, October 06, 2022.

Keynote Speaker, Condensate 2.0 symposium organized by University of Cambridge consortium for condensates, Cambridge, July 14, 2022.

Keynote Speaker, IUBMB-FEBA-PABMB Young Scientists Forum, Vimeiro, Portugal, July 2022.

Keynote talk, Preamble to the IDPSIG and IDP Seminars joint Early Career Scientists virtual poster session, September 2021.

Mercator Fellow Keynote Lecture, *DFG Priority Program on Phase Separation*, Virtual meet, real eat conference, March 2021.

Student invited seminar speaker, University of Halle, March 08, 2021

Student and postdoc invited speaker, student / postdoc retreat of the *DFG Priority Program on Phase Separation* (SPP2191), Heidelberg, Germany, May 2020 – *postponed due to Covid-19*.

Student Invited Colloquium Speaker, University of Washington, *Physical Chemistry Series*, Seattle, WA, February 2020.

Closing Keynote Speaker, EMBO workshop on *Intrinsically Disordered Proteins: From Molecules to Systems*, Bangalore, India, December 2019.

Featured speaker, American Chemical Society Webinar Series, Phase Separation of Multivalent Proteins, co-produced with Biochemistry, November 2019

Opening Keynote Speaker, Gordon Research Conference on Computational Aspects of Biomolecular NMR, Les Diablerets, Switzerland, June 2019.

Student Invited Closing Keynote Speaker for Gordon Research Seminar on Computational Aspects of Biomolecular NMR, Les Diablerets, Switzerland, June 2019: *Uncovering the marvels of protein conformational heterogeneity along roads less traveled*.

Keynote Speaker, Dutch Biophysical Society, Veldhoven, Netherlands, October 2018.

Invited to give the Telluride town talk entitled *Neurodegeneration from the ground up* as an accompaniment to the Telluride Science Research Conference Series, July 2015.

Distinguished Speaker, Syracuse Biomaterials Institute, Syracuse University, April 2017.

Keynote Speaker, International Symposium on Chromatin Dynamics: Theoretical and Polymer Physics Approaches, Hiroshima, Japan, December 2015.

Opening Keynote Speaker, 12<sup>th</sup> Annual New England Structure Symposium (NESS), Theme: Structure and Dynamics of Intrinsically Unfolded Proteins, sponsored by the University of Connecticut, Storrs, CT, October 2015.

Keynote Speaker, 29<sup>th</sup> Annual Gibbs Conference on Biothermodynamics, Touch of Nature Conference Center, Carbondale, IL October 2015.

Keynote Speaker at the Annual Symposium of the Cellular Dynamics and Macromolecular Complexes CREATE Graduate Training Program, University of Montreal, Canada, August 2015.

Keynote Speaker, Intrinsically Disordered Proteins Gordon Research Conference, July 2014.

Keynote Speaker, 8<sup>th</sup> Annual Symposium of the Biophysical Society's Intrinsically Disordered Proteins Subgroup, February 2014.

Keynote Speaker, Annual Midwest Conference on Protein Folding, Assembly, and Molecular Motions, May 2011.

### ***Invited Talks at National and International Conferences / Symposia / Workshops***

Invited Speaker, Gutenberg Workshop on *Multivalent Interactions in Aging*, Gutenberg, Germany, May 2023.

Invited Speaker, International Symposium on Membraneless Organelles in Cell Life and Disease, Organized by the Areces Foundation, Seville, Spain, March 2023.

Invited Plenary Speaker, *Phase Separation Regulated Life, In and Outside of Cells*, Organized by Nanyang Technological Institute, Singapore, March 2023.

Invited Speaker and Co-organizer, *Keystone Symposium on Biomolecular Condensates*, Vancouver, Canada, January 2023.

Invited Speaker, *New concepts in the organization of the nucleus*, National Cancer Institute, Virtual Symposium, October 2022.

- Invited Speaker and Session Chair, Cold Spring Harbor Symposium on *Genome organization and nuclear function*, Cold Spring Harbor, NY, May 2022.
- Invited Speaker, Institute for Quantitative Biosciences crash course on *Intrinsically Disordered Biological Macromolecules in Cell Signaling / Regulation*, Virtual Event, April 2022.
- Invited Speaker, Telluride Science Research Conference on *Phase separation in biology and disease*, Telluride, CO, March 2022.
- Invited Speaker, Royal Society workshop on *Anhydrobiosis – cheating death and telling the tale*, Virtual Event, March 2022.
- Invited Speaker, CECAM meeting, *From disordered biomolecular complexes to biological coacervates*, Zurich, Switzerland, March 2022.
- Invited Speaker, *Biophysics-101: Phase separation*, 66<sup>th</sup> Annual Meeting of the Biophysical Society, San Francisco, CA, February 2022.
- Invited Speaker, *DFG Priority Program on Phase Separation*, Virtual meeting, December 2021.
- Invited Speaker, Cell Symposia on *Biological Assemblies: Phase separation and more*, Virtual meeting, October 31 – November 03, 2021.
- Invited Speaker, 2021 Online Meeting of the German Society of Cell Biology, *Life in between – The Cell Biology of Interfaces*, Plenary speaker in session on Phase Separation and Membraneless Organelles, Münster, Germany, September 2021.
- Invited Speaker, *Genome Biology and Disease Meeting*, Organized by AAAS and Science Magazine, Virtual globally and in person in China, September 2021.
- Invited Speaker, Telluride Science Research Conference on *Intrinsically Disordered Proteins*, July 2021.
- Invited Speaker, *Protein Folding & Dynamics*, Webinar series, July 2021.
- Invited Speaker, *FASEB meeting on Protein Aggregation*, Virtual meeting, June 2021.
- Invited Speaker, Online meeting *Phase Separated Systems in the Nucleus (PSINU)*, hosted by IISER Pune, India, April 6 – 9, 2021
- Invited Speaker, *Proteostasis consortium*, Weekly seminar series, March 10, 2021
- Invited Speaker, 3<sup>rd</sup> RIKEN Biosystems Dynamics Research Symposium – *Structuring biosystems: functions emerging from molecules*. Virtual event, March 1-3, 2021.
- Invited speaker, <http://condensates.com> kitchen table talk series. Delivered three separate one-hour lectures as part of a series focused on the Molecular Grammar of Biomolecular Condensate Formation and Regulation. July and August 2020.
- Invited Speaker, NSF Sponsored Workshop and International Summer School on *Genome Architecture and Dynamics*, Massachusetts Institute of Technology, Cambridge, MA, June 2020 – *postponed due to Covid19*.
- Invited Speaker, Canadian Institute for Advanced Research (CIFAR) symposium on *Scaling in Complexity to Living Systems – Molecular Architecture of Life*, Vancouver, Canada, April 2020 – *canceled due to Covid-19*.
- Invited Speaker, 2020 *Symposium on Intrinsically Disordered Proteins: From fundamental biology to disease*, organized by the Intrinsically Disordered Proteins Specific Interest Group (IDPSIG), Stanford University, February 2020.
- Invited Speaker, Telluride Science Research Conference on *Intrinsically Disordered Proteins*, Telluride, CO, July 2019.
- Invited Speaker, *Cell Press Symposium on Regulatory RNAs*, Berlin, Germany, May 2019.
- Invited Speaker, Keystone Symposium on *Biomolecular Condensates: Phase separated organizers of cellular biochemistry*, Snowbird, Utah, April 2019.

- Invited Symposium Speaker, 63<sup>rd</sup> Annual Meeting of the Biophysical Society, *Session on Phase Separation*, Baltimore, March 2019.
- Invited Speaker, *Symposium on Phase Separation in Biology and Disease*, New York Academy of Sciences, February 2019.
- Invited Speaker, *workshop on Phase Transitions in Polymeric and Protein Systems*, Organized by the Max Planck Institute for Physics of Complex Systems, Dresden, Germany, February 2019.
- Invited Lecturer, *EMBO course on Phase Transitions in Polymeric and Protein Systems*, Organized by the Max Planck Institute for Cell Biology & Genetics, Dresden, Germany, February 2019.
- Invited Speaker, 2019 *BMES Cellular and Molecular Bioengineering Conference*, San Diego, CA, January 2019.
- Invited Speaker and Session Chair, *Intrinsically Disordered Proteins Gordon Research Conference*, Les Diablerets, Switzerland, July 2018.
- Invited Speaker, *EMBO | EMBL Symposium: Cellular Mechanisms Driven by Liquid Phase Separation*, Heidelberg, Germany, May 2018.
- Invited Speaker, *ASBMB Symposium at Experimental Biology*, San Diego, CA, April 2018.
- Invited Speaker, 13<sup>th</sup> *CHDI Annual Huntington's Disease Therapeutics Conference: A forum for Drug Discovery and Development*, Palm Springs, CA, February 2018.
- Invited Speaker, *International Conference on Intrinsically Disordered Proteins*, IISER Mohali, India, December 2017.
- Invited Speaker, Build the Cell Subgroup Symposium at the Annual Meeting of the American Society for Cell Biology, Philadelphia, PA, December 2017.
- Invited Speaker, Telluride Science Research Conference on Intrinsically Disordered Proteins and Membraneless Organelles, Telluride, CO, July 2017.
- Invited Speaker, Proteins Gordon Research Conference, Holderness, New Hampshire, June 2017.
- Invited Speaker, Inaugural symposium of the St. Jude Research Collaborative on membraneless organelles, The Biology of Liquid Organelles, St. Jude Children's Research Hospital, May 2017.
- Invited Speaker, New Frontier in Cellular Structure and Function, Genetics, Genomics and Systems Biology Symposium Sponsored by the University of Chicago, May 2017.
- Invited Speaker, VIB Conference Series, Phase Transitions in Biology and Disease, Leuven, Belgium, May 2017.
- Invited Speaker, Symposium on Coacervation: Physics, Chemistry, and Biology. Part of the 253<sup>rd</sup> National Meeting of the American Chemical Society, San Francisco, April 2017.
- Invited Speaker, 3<sup>rd</sup> International Workshop on Protein Folding & Dynamics, National Centre for Biological Sciences, Bangalore, India, November 2016.
- Invited Speaker, 2<sup>nd</sup> COST Symposium on Non-Globular Proteins in Molecular Pathophysiology, Belgrade, Serbia, September 2016.
- Invited Speaker, Physical Chemistry Division Symposium In Intrinsically Disordered Proteins at the 252<sup>nd</sup> National Meeting of the American Chemical Society, August 2016.



- Invited Speaker, 30<sup>th</sup> Anniversary Symposium of the Protein Society, July 2016.
- Invited Speaker, 3<sup>rd</sup> Workshop on the Physical Basis of Cellular Adaptation & Memory, Bellairs Research Institute, Barbados, April 2016.
- Invited Speaker, CHDI Htt Protein Lifecycle Workshop, New York City, March 2016.
- Invited Symposium Speaker, 60<sup>th</sup> Annual Meeting of the Biophysical Society, Los Angeles, CA March 2016.
- Invited Speaker, Southeast and Southwest regional meeting of the American Chemical Society, Symposium on Intrinsically Disordered Proteins, Memphis, TN, November 2015.
- Invited Speaker, CECAM Workshop on Computational Modeling of Intrinsically Disordered Proteins, Zurich, Switzerland August 2015.
- Invited Speaker, FASEB meeting on Molecular Mechanisms and Physiological Consequences of Protein Aggregation, June 2015.
- Invited Speaker, Proteins Gordon Research Conference, Holderness, New Hampshire, June 2015.
- Invited Speaker, Conference on Intracellular Phase Transitions: RNA, Protein, Lipids, and Beyond. Princeton University, April 2015.
- Invited Speaker, International Scientific Seminar, Chromosome Dynamics: Computational Models and Experimental Data, Sponsored by the Royal Society, Chicheley Hall, Buckinghamshire, UK, November 2014.
- Invited Speaker and Session Chair, Thematic Meeting, Disordered Motifs and Domains in Cell Control, Dublin Ireland – Sponsored by the Biophysical Society, October 2014.
- Invited Speaker, Gordon Research Conference on Protein Folding Dynamics, January 2014.
- Invited Speaker, 3<sup>rd</sup> USA-Mexico Workshop in Biological Chemistry: Protein Folding, Dynamics, and Function, November 2013.
- Invited Speaker, CECAM International Workshop on Intrinsically Disordered Proteins, ETH Zurich, September 2013.
- Invited Speaker, FASEB Summer Research Conference on Molecular Mechanisms and Physiological Consequences of Protein Aggregation, June 2013.
- Invited Speaker, 57<sup>th</sup> Annual Meeting of the Biophysical Society, February 2013.
- Invited Speaker, International Symposium on Protein Folding, National Centre for Biological Sciences, Bangalore, India, October 2012
- Invited Speaker, Biopolymers Gordon Research Conference, June 2012
- Invited Speaker, Gordon Research Conference on Protein Folding Dynamics, January 2010
- Invited Speaker, FASEB Summer Research Conference on Biophysics and Biology of Amyloids, June 2009
- Invited Speaker and Session Chair, 53<sup>rd</sup> Annual Meeting of the Biophysical Society, March 2009
- Invited Speaker, 22<sup>nd</sup> Annual Symposium of The Protein Society, July 2008
- Invited Speaker, Biopolymers Gordon Research Conference, June 2008
- Invited Speaker and Symposium Co-Chair, 2<sup>nd</sup> Annual Symposium of the Biophysical Society's Intrinsically Disordered Proteins Subgroup, February 2008

Invited Speaker, FASEB Amyloid Meeting, June 2006

Invited speaker, I2CAM Workshop on Protein Aggregation and Amyloid Formation in Systemic and Neurodegenerative Diseases, EPFL, Lausanne, Switzerland, July 2005

**Peer Reviewed Publications (reverse chronological order) includes articles in press (Google scholar h-index: 67; i10 index 128)**

- Pub.01.** N.S. Gonzalez-Foutel, W.M. Borchers, J. Glavina<sup>1</sup>, S. Barrera-Vilarmau, A. Sagar, A. Estaña, A. Barozet, G. Fernandez-Ballester, C. Blanes-Mira, I.E. Sánchez, G. de Prat-Gay, J. Cortés, P. Bernadó, **R.V. Pappu**<sup>\*</sup>, A.S. Holehouse<sup>\*</sup>, G.W. Daughdrill<sup>\*</sup> L.B. Chemes<sup>\*</sup>. (<sup>\*</sup>Co-corresponding authors). (2022). Conformational buffering underlies functional selection in intrinsically disordered protein regions. *Nature Structural and Molecular Biology*, **29**: 781-790.
- Pub.02.** K.M. Ruff<sup>§</sup>, Y-H. Choi<sup>§</sup>, D. Cox, A. Ormsby, Y. Myung, D. B. Ascher, S.E. Radford, **R.V. Pappu**<sup>†</sup>, D.M. Hatters<sup>†</sup>. (2022). Sequence grammar for phase separation of unfolded states of globular proteins. (<sup>§</sup>Co-first authors; <sup>†</sup>Co-corresponding authors). *Molecular Cell*, **82**: <https://doi.org/10.1016/j.molcel.2022.06.024>.
- Pub.03.** M. Kar, F. Dar, T. J. Welsh, L. Vogel, R. Kühnemuth, A. Majumdar, G. Krainer, T. M. Franzmann, S. Alberti, C. A. M. Seidel, T. P.J. Knowles, A. A. Hyman<sup>†</sup>, **R. V. Pappu**<sup>†</sup>. (2022). Phase separating RNA binding proteins form heterogeneous distributions of clusters in subsaturated solutions. (<sup>†</sup>Co-corresponding authors). *Proceedings of the National Academy of Sciences USA*, **119**: e2202222119.
- Pub.04.** T. Mittag, **R.V. Pappu**. (2022). A conceptual framework for understanding phase separation and addressing open questions and challenges. Peer reviewed, commissioned perspective. *Molecular Cell*, **82**: 2201-2214.
- Pub.05.** X. Zeng, K.M. Ruff, **R.V. Pappu**. (2022). Competing interactions give rise to two-state behavior and switch-like transitions in charge-rich intrinsically disordered proteins. *Proceedings of the National Academy of Sciences USA*, **119**: e2200559119.
- Pub.06.** I. Seim, A.E. Posey, W.T. Snead, B.M. Stormo, D. Klotsa, **R.V. Pappu**<sup>†</sup>, A.S. Gladfelter<sup>†</sup>. (<sup>†</sup>Co-corresponding authors). (2022). Dilute phase oligomerization opposes phase separation and modulates material properties of a ribonucleoprotein condensate. *Proceedings of the National Academy of Sciences USA*, **119**: e2120799119.
- Pub.07.** M.V. Staller, E. Ramirez, A.S. Holehouse, **R.V. Pappu**, B.A. Cohen. (2022). Directed mutational scanning reveals a balance between acidic and hydrophobic residues in strong human activation domains. *Cell Systems*, **13**: 334-335.e5.
- Pub.08.** M.C. Cohan<sup>†</sup>, M-K. Shinn<sup>†</sup>, J.M. Lalmansingh, **R.V. Pappu** (2022). Uncovering non-random binary patterns within sequences of intrinsically disordered proteins. (<sup>†</sup>Co-first authors). *Journal of Molecular Biology*, **434**: 167373.
- Pub.09.** A. Bremer<sup>§</sup>, M. Farag<sup>§</sup>, W.M. Borchers<sup>§</sup>, I. Peran, E.W. Martin, **R.V. Pappu**<sup>†</sup>, T. Mittag<sup>†</sup>. (2022). Deciphering how naturally occurring sequence impact the phase behaviors of disordered prion-like domains. (<sup>§</sup>Co-first authors; <sup>†</sup>Co-corresponding authors). *Nature Chemistry*, **14**: 196-207.
- Pub.10.** L-P Bergeron-Sandoval, S. Kumar, H.K. Heris, C.L.A. Chang, C.E. Cornell, S. L. Keller, P. François, A.G. Hendricks, A.J. Ehrlicher, **R.V. Pappu**<sup>†</sup>, S. W. Michnick<sup>†</sup>. (2021). Endocytic proteins with prion-like domains form viscoelastic condensates that enable membrane remodeling. (<sup>†</sup>Co-corresponding authors). *Proceedings of the National Academy of Sciences USA*, **118**: e2113789118.

- Pub.11.** M.J. Fossat, A.E. Posey, **R.V. Pappu**. (2021). Quantifying charge state heterogeneity for proteins with multiple ionizable residues. *Biophysical Journal*, **120**: 1-16.
- Pub.12.** M. Kar, A.E. Posey, F. Dar, A.A. Hyman\*, **R.V. Pappu\***. (2021). Glycine-rich peptides from FUS have an intrinsic ability to self-assemble into fibers and networked fibrils. (\*Co-corresponding authors). *Biochemistry*, **60**: 3213 – 3222.
- Pub.13.** K.M. Ruff, **R.V. Pappu**. (2021). AlphaFold and implications for intrinsically disordered proteins. *Journal of Molecular Biology*, **433**: 167208.
- Pub.14.** K.M. Ruff, F. Dar, **R.V. Pappu**. (2021). Polyphasic linkage and the impact of ligand binding on the regulation of biomolecular condensates. *Biophysics Reviews*, **2**: 021302.
- Pub.15.** M.J. Fossat<sup>†</sup>, X. Zeng<sup>†</sup>, **R.V. Pappu**. (2021) Uncovering differences in hydration free energies and structures for model compound mimics of charged sidechains of amino acids. (†Co-first authors). *Journal of Physical Chemistry B*, **125**: 4148-4161.
- Pub.16.** A.E. Posey<sup>§,†</sup>, K.M. Ruff<sup>§</sup>, J.M. Lalmansingh<sup>§</sup>, T. Kandola, R. Halfmann, **R.V. Pappu**<sup>†</sup>. (2021). Mechanistic inferences from analysis of measurements of protein phase transitions in live cells. (§Co-first authors; †Co-corresponding authors). *Journal of Molecular Biology*, **433**: 166848.
- Pub.17.** X. Zeng, C. Liu, M.J. Fossat, P. Ren, A. Chilkoti, **R.V. Pappu**. (2021). Design of intrinsically disordered proteins that undergo phase transitions with lower critical solution temperatures. *APL Materials*, **9**: 021119.
- Pub.18.** K.M. Ruff<sup>§,†</sup>, F. Dar<sup>§</sup>, **R.V. Pappu**<sup>†</sup>. Ligand effects on phase separation of multivalent macromolecules. (2021). (§Co-first authors; †Co-corresponding authors). *Proceedings of the National Academy of Sciences USA*, **118**: e2017184118.
- Pub.19.** T. Lazar, E. Martínez-Pérez, F. Quaglia<sup>5</sup>, A. Hatos, L. B. Chemes, J.A. Iserte, N. A. Méndez, N. A. Garrone, T. E. Saldaño, J. Marchetti, A. J. Velez Rueda, P. Bernado, M. Blackledge, T. N. Cordeiro, E. Fagerberg, Julie D. Forman-Kay, M. S. Fornasari, T. J. Gibson, G-N. W. Gomes, C. C. Gradinaru, T. Head-Gordon, M. R. Jensen, E. A. Lemke, S. Longhi, C. Marino-Buslje, G. Minervini, T. Mittag, A. M. Monzon, **R.V. Pappu**, G. Parisi, S. Ricard-Blum, K. M. Ruff, E. Salladini, M. Skepö, D. Svergun, S. D. Vallet, M. Varadi, P. S. Tompa\*, S. C.E. Tosatto\*, D. Piovesan. (2021). PED in 2021: A major update of the protein ensemble database for intrinsically disordered proteins. *Nucleic Acids Research*, **49**: D404-D411.
- Pub.20.** M. Lorenzini, S. Burel, A. Lesage, E. Wagner, C. Charrière, P-M. Chevillard, M. Bélangère, D. Maloney, K.M. Ruff, **R. V. Pappu**, S. Wagner, J.M. Nerbonne, J. R. Silva, R.R. Townsend, L.S. Maier, C. Marrionneau. (2021). Proteomic and functional mapping of cardiac Na<sub>v</sub>1.5 channel phosphorylation reveals multisite regulation of surface expression and gating. *Journal of General Physiology*, **153**: e202012646.
- Pub.21.** C. Mathieu, **R.V. Pappu**, J.P. Taylor. (2020). Beyond aggregation: pathological phase transitions in neurodegenerative disease. *Science*, **370**: 56-60.
- Pub.22.** J-M. Choi, A.A. Hyman, **R.V. Pappu**. (2020). Generalized models for bond percolation transitions of associative polymers. *Physical Review E*, **102**: 042403.
- Pub.23.** F. Dar, **R.V. Pappu**. (2020). Restricting the size of condensates. *eLife*, **9**:e59663. *Invited and reviewed insight article*.
- Pub.24.** X. Zeng, A.S. Holehouse, A. Chilkoti, T. Mittag, **R.V. Pappu**. (2020). Connecting coil-globule transitions to full phase diagrams for intrinsically disordered proteins. *Biophysical Journal*. **119**: 1- 17.

- Pub.25.** M.C. Cohan, **R.V. Pappu**. (2020). Making the case for disordered proteins and biomolecular condensates in bacteria. *Trends in Biochemical Sciences*, **45**: 668-680.
- Pub.26.** M.C. Cohan, A.M.P. Eddelbuettel, P.A. Levin, **R.V. Pappu**. Dissecting the functional contributions of the intrinsically disordered C-terminal tail of *B. subtilis* FtsZ. (2020). *Journal of Molecular Biology*, **432**: 3205 – 3221.
- Pub.27.** J. Guillén-Boixet, A. Kopach, A. S. Holehouse, S. Wittmann, M. Jahnel, R. Schlüßler, I. R. E. A. Trussina, J. Wang, D. Mateju, I. Poser, S. Maharana, M. Ruer-Gruß, D. Richter, Y-T. Chang, A. Honigmann, A. A. Hyman, **R.V. Pappu**, S. Alberti, T. M. Franzmann. (2020) RNA induces conformational rearrangements and clustering of G3BP that drive condensation and stress granule formation. *Cell*, **181**: 346-361.
- Pub.28.** J. A. Greig, T.A. Nguyen, M. Lee, A. S. Holehouse, A.E. Posey, **R.V. Pappu**, G.J. Jedd. Arginine-enriched mixed-charge domains provide cohesion for nuclear speckle condensates. (2020). *Molecular Cell*, **77**: 1-14.
- Pub.29.** E.W. Martin<sup>†</sup>, A. S. Holehouse<sup>†</sup>, I. Peran<sup>†</sup>, M. Farag, J.J. Incicco, A. Bremer, C.R. Grace, A. Soranno, **R.V. Pappu**<sup>§</sup>, T. Mittag<sup>§</sup>. (2020). (†Co-first authors and §co-corresponding authors). Valence and patterning of aromatic residues determine the phase behavior of prion-like domains. *Science*. **367**: 694-699.
- Pub.30.** J-M. Choi, A.S. Holehouse, **R.V. Pappu**. (2020). Physical principles underlying the complex biology of intracellular phase transitions. *Annual Review of Biophysics*, **49**: 107-133.
- Pub.31.** J-M. Choi<sup>†</sup>, F. Dar<sup>†</sup>, **R.V. Pappu**. (2019). LASSI: A lattice model for simulating phase transitions of multivalent proteins. (†Co-first authors). *PLoS Computational Biology*, **15**: e1007028.
- Pub.32.** M. J. Fossat, **R.V. Pappu**. (2019). *q*-Canonical Monte Carlo sampling for modeling the linkage between charge regulation and conformational equilibria of peptides. *Journal of Physical Chemistry B*, **123**: 6952-6967.
- Pub.33.** M.C. Cohan, K.M. Ruff, **R.V. Pappu**. (2019). Information theoretic measures for quantifying sequence-ensemble relationships of intrinsically disordered proteins. *Protein Engineering, Design, and Selection*, **32**: 191-202.
- Pub.34.** S.K. Powers, A.S. Holehouse, D.A. Korasick, K.H. Schreiber, E. Tycksen, J.M. Jez, **R.V. Pappu**, L.C. Strader. (2019). Nucleo-cytoplasmic partitioning of ARF proteins control auxin responses in *Arabidopsis thaliana*. *Molecular Cell*, **76**: 175-190.e5.
- Pub.35.** W. Bai, C. Sargent, J-M. Choi, **R.V. Pappu**, F. Zhang. (2019). Covalently assembled single chain protein nanostructures with ultrahigh stability. *Nature Communications*, **10**: 3317.
- Pub.36.** J. Cable, C. Brangwynne, G. Seydoux, D. Cowburn, **R.V. Pappu**, C.A. Castañeda, L.E. Berchowitz, Z. Chen, M. Jonikas, A. Dernburg, T. Mittag, N.L. Fawzi. Phase separation in Biology and Disease – a symposium report. (2019). *Annals of the New York Academy of Sciences*. **1452**: 3-11.
- Pub.37.** I. Peran<sup>\*</sup>, A.S. Holehouse<sup>\*</sup>, I.S. Caricco, **R.V. Pappu**<sup>†</sup>, O. Bilsel<sup>†</sup>, D.P. Raleigh. (2019). Unfolded states under folding conditions accommodate sequence-specific conformational preferences alongside ensemble-averaged features of random coils. *Proceedings of the National Academy of Sciences USA*. **116** (25): 12301 – 12310. (<sup>\*</sup>Co-first authors; <sup>†</sup>Co-corresponding authors).
- Pub.38.** S. Boeynaems<sup>†</sup>, A.S. Holehouse, V. Weinhardt, D. Kovacs, J. Van Lindt, C. Larabell, L. Van Den Bosch, R. Das, P. Tompa, **R.V. Pappu**<sup>†</sup>, A. Gitler<sup>†</sup>. (2019). Spontaneous driving forces give rise to protein-RNA condensates with coexisting phases and complex material

properties. *Proceedings of the National Academy of Sciences USA*. **116** (16): 7889-7898. (†Co-corresponding authors).

- Pub.39.** R. Beveridge\*, L G. Migas\*, R. K. Das, **R. V. Pappu**, R. W. Kriwacki, P. E. Barran. (2019). Ion mobility mass spectrometry helps uncover the impact of charge patterning on the conformational distributions of intrinsically disordered proteins. *Journal of the American Chemical Society*, **141**(12): 4908-4918. (\*Co-first authors).
- Pub.40.** J-M. Choi, **R.V. Pappu**. (2019). Improvements to the ABSINTH forcefield for proteins based on experimentally derived amino-acid specific backbone conformational statistics. *Journal of Chemical Theory and Computation*, **15**: 1367-1382.
- Pub.41.** J-M. Choi, **R.V. Pappu**. (2019). Experimentally derived and computationally optimized conformational statistics for blocked amino acids. *Journal of Chemical Theory and Computation*, **15**: 1355-1366.
- Pub.42.** K. M. Ruff\*, **R.V. Pappu\***, A.S. Holehouse\*. (2019). Conformational preferences and phase behavior of low complexity sequences: Insights from multiscale simulations. *Current Opinion in Structural Biology*, **56**: 1-10. (\*Co-corresponding authors).
- Pub.43.** A.E. Posey†, A.S. Holehouse†, **R.V. Pappu**. (2018). Phase separation of intrinsically disordered proteins. *Methods in Enzymology*, **611**: 1-30. (†Co-first authors).
- Pub.44.** S. Roberts, T. S. Harmon, J. Schaal, K. Li, A. Hunt, V. Miao, Y. Wen, T. G. Oas, J. Collier, **R. V. Pappu**, A. Chilkoti. (2018). Injectable tissue integrating networks from recombinant polypeptides with tunable order. *Nature Materials*, **17**: 1154–1163. **In the news:** <https://pratt.duke.edu/about/news/biomaterials-frankenstein-proteins-help-heal-tissue>
- Pub.45.** G. Fuertes, N. Banterle, K.M. Ruff, A. Chowdhury, **R.V. Pappu\***, D. I. Svergun\*, E.A. Lemke\*. (2018). Comment on “Innovative scattering analysis shows that hydrophobic disordered proteins are expanded in water.” *Science*, **361**: eaau8230. Technical comment solicited by the editors. (\*Co-corresponding authors).
- Pub.46.** T.Y. Yoo, J-M. Choi, W. Conway, C-H. Yu, **R.V. Pappu**, D.J. Needleman. (2018). Measuring NDC80 binding reveals molecular basis of tension-dependent kinetochore-microtubule attachments. *eLife*, **7**: e36392.
- Pub.47.** K.M. Ruff, S. Roberts, A. Chilkoti\*, **R.V. Pappu\***. (2018). Advances in understanding stimulus responsive phase behavior of intrinsically disordered protein polymers. *Journal of Molecular Biology*. **430**: 4619-4635. (\*Co-corresponding authors)
- Pub.48.** J. Wang, J-M. Choi, A.S. Holehouse, X. Zhang, M. Jahnel, S. Maharana, R. Lemaitre, A. Pozniakovski, D. Drechsel, I. Poser, **R. V. Pappu**, S. Alberti, A. A. Hyman. (2018). A molecular grammar underlying the driving forces for phase separation of prion-like RNA binding proteins. *Cell*, **174**: 688-699.
- Pub.49.** H. Mirbaha, D. Chen, O.A. Morozova, K.M. Ruff, A. Sharma, X. Liu, M. Goodarzi, **R.V. Pappu**, D.W. Colby, H. Mirzai, L.A. Jochimiak, M.I. Diamond. (2018). Inert and seed-competent tau monomers elucidate the structural origins of aggregation. *eLife*, **7**: e36584.
- Pub.50.** A. Mittal, A.S. Holehouse, M.C. Cohan, **R.V. Pappu**. (2018). Sequence-to-conformation relationships of disordered regions tethered to folded domains of proteins. *Journal of Molecular Biology*, **430**: 2403-2421.
- Pub.51.** E. A. Newcombe<sup>§</sup>, K. M. Ruff<sup>§</sup>, Y. M. Ramdzan, A. Sethi, A. R. Ormsby, O. Kleifeld, A. W. Purcell, P. R. Gooley, **R. V. Pappu\***, D. M. Hatters<sup>†</sup>. (2018). Tadpole-like conformations of huntingtin exon 1 are characterized by conformational heterogeneity that persists for wild type and pathogenic polyglutamine lengths. (<sup>§</sup>Co-first authors, \*Co-corresponding authors).

*Journal of Molecular Biology*, **430**: 1442-1458.

- Pub.52.** T.S. Harmon, A.S. Holehouse, **R.V. Pappu**. (2018). Differential solvation of intrinsically disordered linkers drives the formation of spatially organized droplets in ternary systems of linear multivalent proteins. *New Journal of Physics*, **20**: 045002.
- Pub.53.** K. Garai, A.E. Posey, X. Li, E.M. Powers, J. Buxbaum, **R.V. Pappu**. (2018). Inhibition of amyloid beta fibril formation by monomeric human Transthyretin. *Protein Science*, **27**: 1252-1261.
- Pub.54.** M.V. Staller, A.S. Holehouse, D. Swain-Lenz, R.K. Das, **R.V. Pappu**, B.A. Cohen. (2018). A high-throughput mutational scan of an intrinsically disordered acidic transactivation domain. *Cell Systems*, **6**: 444-455.e6.
- Pub.55.** A.E. Posey, K.M. Ruff, T.S. Harmon, S.L. Crick, A. Li, M.I. Diamond, **R.V. Pappu**. (2018). Profilin reduces aggregation and phase separation of huntingtin N-terminal fragments by preferentially binding to soluble monomers and oligomers. *Journal of Biological Chemistry*, **293**: 3734-3746. (**Article selected to be part of the JBC special issue on Amyloids, Prions, and Oligomers** - <http://www.jbc.org/site/vi/amyloids/>)
- Pub.56.** A.S. Holehouse, **R.V. Pappu**. (2018). Collapse transitions of proteins and the interplay amongst polypeptide backbone, sidechain, and solvent interactions. *Annual Review of Biophysics*, **47**: 19-39.
- Pub.57.** A.S. Holehouse, **R.V. Pappu**. (2018). Functional implications of intracellular phase transitions. *Biochemistry*, **57**: 2415-2423.
- Pub.58.** T. M. Franzmann, M. Jahnel, A. Pozniakovsky, J. Mahamid, A.S. Holehouse, E. Nüske, D. Richter, W. Baumeister, S.W. Grill, **R.V. Pappu**, A.A. Hyman, S. Alberti. (2018). Phase separation by a yeast prion protein promotes cellular fitness. *Science*, **359**: eaao5654.
- Pub.59.** J. Fei\*, M. Jadhav<sup>§</sup>, T. S. Harmon<sup>§</sup>, I.T.S. Li, B. Hua, A. S. Holehouse, M. Reyer, Q. Sun, S. M. Freier, **R. V. Pappu**, K. V. Prasanth\*, T.J. Ha. Proteins and RNAs display multilayer organization in nuclear speckles. (2017). (\*co-corresponding authors; <sup>§</sup>equal contributors). *Journal of Cell Science*, **130**: 4180-4192.
- Pub.60.** T.S. Harmon, A.S. Holehouse, M.K. Rosen, **R.V. Pappu**. (2017). Intrinsically disordered linkers determine the interplay between phase separation and gelation in multivalent proteins. *eLife*, **6**:30294. <https://source.wustl.edu/2017/12/engineers-uncover-design-principles-cellular-compartments>.
- Pub.61.** J. B. Warner IV<sup>§</sup>, K. M. Ruff<sup>§</sup>, P. S. Tan, E. A. Lemke, **R. V. Pappu\***, H. A. Lashuel\*. Monomeric huntingtin exon 1 has similar overall structural features for wild type and pathological polyglutamine length. (2017). (<sup>§</sup>Co-first authors, \*Co-corresponding authors). *Journal of the American Chemical Society*, **139**: 14456 – 14469. **In the news:** <https://source.wustl.edu/2017/10/imaging-a-killer/>
- Pub.62.** K. Sherry, R.K. Das, **R.V. Pappu\***, D. Barrick\*. Control of transcriptional activity through *de novo* design of sequence-to-conformation relationships of the intrinsically disordered RAM region of the Notch intracellular domain. (2017). (\*Co-corresponding authors). *Proceedings of the National Academy of Sciences USA*, **114**: E9243 – E9252. **Selected and evaluated by Faculty of 1000.**
- Pub.63.** G. Fuertes<sup>#</sup>, N. Banterle<sup>#</sup>, K.M. Ruff<sup>#</sup>, A. Chowdhury, D. Mercadante, C. Koehler, M. Kachala, G. E. Girona, S. Milles, A. Mishra, P. R. Onck, F. Gräter, S. Esteban-Martin, **R.V. Pappu\***, D. I. Svergun\*, E. A. Lemke\* (<sup>#</sup>Co-first authors, \*Co-corresponding authors). Decoupling of size and shape fluctuations in heteropolymeric sequences reconciles

- discrepancies in SAXS versus FRET measurements. (2017). *Proceedings of the National Academy of Sciences USA*, **114**: E6342-E6351.
- Pub.64.** S. Chatterjee, P. Luthra, E. Esaulova, E. Agapov, B. Yen, D. Borek, M. Edwards, A. Mittal, D. Jordan, P. Ramanan, M. Moore, **R.V. Pappu**, M. Holtzman, M.N. Artyomov, C. Basler, G. Amarasinghe, and D. Leung (2017). Structural basis for human respiratory syncytial virus NS1-mediated modulation of host responses. *Nature Microbiology*, **2**: 17101(1-8).
- Pub.65.** M-T. Wei<sup>#</sup>, S. Elbaum-Garfinkle<sup>#</sup>, A.S. Holehouse<sup>#</sup>, C. C-H. Chen, M. Feric, C.B. Arnold, R. D. Priestly, **R.V. Pappu**<sup>\*</sup>, C.P. Brangwynne<sup>\*</sup>. (2017). Phase separation of intrinsically disordered proteins yields permeable, low-density liquid droplets. *Nature Chemistry*, **9**: 1118 – 1125. (<sup>#</sup>Co-first authors, <sup>\*</sup>Co-corresponding authors). **In the news:** [https://www.eurekalert.org/pub\\_releases/2017-06/wuis-dd062617.php](https://www.eurekalert.org/pub_releases/2017-06/wuis-dd062617.php);
- Pub.66.** V. Kalas, J.S. Pinkner, T. J. Hannan, M. E. Hibbing, K. W. Dodson, A. S. Holehouse, H. Zhang, N. H. Tolia, M. L. Gross, **R. V. Pappu**, J. Janetka, S.J. Hultgren. (2017). Evolutionary fine-tuning of conformational ensembles in FimH during host-pathogen interactions. *Science Advances*. **3**: e1601944.
- Pub.67.** A. S. Holehouse<sup>\*</sup>, R.K. Das, J. Ahad, M. O. G. Richardson, **R.V. Pappu**<sup>\*</sup>. (2017). CIDER: Resources to analyze sequence-ensemble relationships of intrinsically disordered proteins. *Biophysical Journal*. **112**: 16-21 (<sup>\*</sup>Co-corresponding authors). **Selected and evaluated by Faculty of 1000.**
- Pub.68.** E.W. Martin<sup>†</sup>, A.S. Holehouse<sup>†</sup>, C.R. Grace, A. Hughes, **R.V. Pappu**<sup>\*</sup>, T. Mittag<sup>\*</sup>. (2016). Sequence determinants of the conformational properties of an intrinsically disordered protein prior to and upon phosphorylation. *Journal of the American Chemical Society* **138**: 15323-15335. (<sup>†</sup>Co-first authors; <sup>\*</sup>Co-corresponding authors).
- Pub.69.** T.S. Harmon, M.D. Crabtree, S.L. Shammass, A.E. Posey, J. Clarke, **R.V. Pappu**. (2016). GADIS: Algorithm for designing sequences to achieve target secondary structure profiles of intrinsically disordered proteins. *Protein Engineering, Design, and Selection*, **29**: 339-346. **Selected and evaluated by Faculty of 1000.**
- Pub.70.** C.W. Pak, M. Kosno, A.S. Holehouse, S. Padrick, A. Mittal, R. Ali, A. Yunus, D. R. Liu, **R.V. Pappu**<sup>\*</sup>, M.K. Rosen<sup>\*</sup>. (2016). Sequence determinants of intracellular phase separation via complex coacervation of a model disordered protein. *Molecular Cell*, **63**: 72-85. <sup>\*</sup>Co-corresponding authors.
- Pub.71.** M. Feric, N. Vaidya, T.S. Harmon, D. M. Mitrea, L. Zhu, T.M. Richardson, R.W. Kriwacki, **R.V. Pappu**, C.P. Brangwynne. (2016). Coexisting liquid phases underlie nucleolar subcompartments. *Cell*. **165**: 1-12.
- Pub.72.** R.K. Das, Y. Huang, A. Phillips, R.W. Kriwacki, **R.V. Pappu**. (2016). Cryptic sequence features within the disordered protein p27<sup>Kip1</sup> regulate cell cycle signaling. *Proceedings of the National Academy of Sciences USA*. **113**: 5616-5621. **In the news:** <https://phys.org/news/2016-05-cancer-cells-tracks.html>.
- Pub.73.** S. Banjade, Q. Wu, A. Mittal, W. Peeples, **R.V. Pappu**, M.K. Rosen. (2015). A Conserved Interdomain Linker Promotes Phase Separation of the Multivalent Adaptor Protein Nck. *Proceedings of the National Academy of Sciences USA*. **112**: E6426 – E6435.
- Pub.74.** K.M. Ruff, T.S. Harmon, **RV. Pappu**. (2015). CAMELOT: A machine learning optimized approach for coarse-grained simulations aggregation of block-copolymeric protein sequences. *Journal of Chemical Physics*. **143**: 243123.

- Pub.75.** C.P. Brangwynne, P.S. Tompa, **R.V. Pappu.** (2015). Polymer Physics of Intracellular Phase Transitions. *Nature Physics.* **11:** 899-904.
- Pub.76.** R.K. Das, K.M. Ruff, **R.V. Pappu.** (2015). Relating sequence encoded information to form and function of intrinsically disordered proteins. *Current Opinion in Structural Biology.* **31:** 102-112.
- Pub.77.** M.I. Diamond, S. Cai, A. Boudreau, C.J. Carey Jr., N. Lyle, **R.V. Pappu,** S.J. Swamidass, M. Bissell, H. Piwnica-Worms, J. Shao. (2015). Subcellular localization and Ser-137 phosphorylation regulate tumor-suppressive activity of profilin-1. *Journal of Biological Chemistry.* **290:** 9075-9086.
- Pub.78.** P.J. Buske, A. Mittal, **R.V. Pappu,** P.A. Levin (2015). An intrinsically disordered linker plays a critical role in bacterial cell division. *Seminars in Cell and Developmental Biology.* **37:** 3-10.
- Pub.79.** A.S. Holehouse, K. Garai, N. Lyle, A. Vitalis, **R.V. Pappu.** Quantitative assessments of the distinct contributions of polypeptide backbones amides versus sidechain groups to chemical denaturation of proteins. (2015). *Journal of the American Chemical Society.* **137:** 2984-2995.
- Pub.80.** A. Mittal, R.K. Das, A. Vitalis, **R.V. Pappu.** (2015). The ABSINTH implicit solvation model and forcefield paradigm for use in simulations of intrinsically disordered proteins. In *Computational Approaches to Protein Dynamics: From Quantum to Coarse-Grained Methods.* Edited by M. Fuxreiter. Chapter 6, 181-203. CRC Press, Boca Raton, FL.
- Pub.81.** A.G. Kozlov, E. Weiland, A. Mittal, V. Waldman, E. Antony, N. Fazio, **R.V. Pappu\***, T.M. Lohman\*. (2015). Intrinsically disordered C-terminal tails of *E. coli* single-stranded DNA binding protein regulate cooperative binding to single stranded DNA. (2014). *Journal of Molecular Biology.* **427:** 763-774. \*Co-corresponding authors. **Selected and evaluated by Faculty of 1000.**
- Pub.82.** L. Ripaud, V. Chumakova, M. Antonin, A. Hastie, S. Pinkert, R. Koerner, K.M. Ruff, **R.V. Pappu,** D. Hornburg, M. Mann, F. U. Hartl, M. S. Hipp. (2014) Overexpression of Q-rich prion-like proteins suppresses polyQ cytotoxicity and alters the polyQ interactome. *Proceedings of the National Academy of Sciences USA.* **111:** 18219-18224.
- Pub.83.** K. M. Ruff, S.J. Khan, **R.V. Pappu.** (2014). A coarse-grained model for polyglutamine aggregation modulated by amphipathic flanking sequences. *Biophysical Journal,* **107:** 1226-1235. **Highlighted on the Biophysical Journal Home Page, September 02-15, 2014.**
- Pub.84.** W. Xu, M.R. Edwards, D.M. Borek, A.R. Feagins, A. Mittal, J.B. Alinger, K.N. Berry, B. Yen, J. Hamilton, T.J. Brett, **R.V. Pappu,** D.W. Leung, C.F. Basler, G.K. Amarasinghe. (2014). Mechanism of cell-intrinsic innate immune antagonism by Ebola virus VP24. *Cell Host & Microbe.* **16:** 187-200. **Featured free article.**
- Pub.85.** A. Mittal, N. Lyle, T. S. Harmon, **R. V. Pappu.** (2014) Hamiltonian Switch Metropolis Monte Carlo Simulations for Improved Conformational Sampling of Intrinsically Disordered Regions Tethered to Ordered Domains of Proteins. *Journal of Chemical Theory and Computation.***10:** 3550-3562.
- Pub.86.** A. Vitalis, **R.V. Pappu.** (2014). A Simple Molecular Mechanics Integrator in Mixed Rigid Body and Dihedral Angle Space. *Journal of Chemical Physics.* **141:** 034105(1-18).
- Pub.87.** A. T. Tubbs, Y. Dorsett, E. Chan, B. Helmink, B. Lee, P. Hung, R. George, A. L. Bredemeyer, A. Mittal, **R. V. Pappu,** D. Chowdhury, N. Mosammamarast, M. S. Krangel, B. P. Sleckman. (2014). KAP-1 Promotes Resection of Broken DNA Ends Not Protected by  $\gamma$ -H2AX



and 53BP1 in G1-Phase Lymphocytes. *Molecular and Cellular Biology*. **34**: 2811-2821. PMID: 24842905.

- Pub.88.** R. Van der Lee, M. Buljan, B. Lang, R. J. Weatheritt, G.W. Daughdrill, A. K. Dunker, M.Fuxreiter, J. Gough, J. Gsponer, D. T. Jones, P. M. Kim, R. W. Kriwacki, C. J. Oldfield, **R. V. Pappu**, P. Tompa, V. N. Uversky, P. E. Wright, M. M. Babu. (2014). Classification of intrinsically disordered regions and proteins. *Chemical Reviews*. **114**: 6959-6631. PMID: 24773235.
- Pub.89.** B. Luan, N. Lyle, **R.V. Pappu**, D.P. Raleigh. (2014). Denatured state ensembles with the same radius of gyration can form significant different long-range contacts. *Biochemistry*. **53**: 39-47. PMID: 24280003.
- Pub.90.** S.L. Crick, K.M. Ruff, K. Garai, C. Frieden, **R.V. Pappu**. Unmasking the roles of N- and C-terminal flanking sequences from exon 1 of huntingtin as modulators of polyglutamine aggregation. *Proceedings of the National Academy of Sciences USA*. **110**: 20075-20080. PMID: 2482292. [http://www.eurekalert.org/pub\\_releases/2013-12/wuis-sao121113.php](http://www.eurekalert.org/pub_releases/2013-12/wuis-sao121113.php).
- Pub.91.** R.K. Das, **R.V. Pappu**. (2013). Conformations of intrinsically disordered proteins are influenced by linear sequence distributions of oppositely charged residues. *Proceedings of the National Academy of Sciences USA*. **110**: 13392-13397. PMID: 23909099.
- Pub.92.** N. Lyle, R.K. Das, **R.V. Pappu**. (2013). A quantitative measure for protein disorder. *The Journal of Chemical Physics*. **139**: 121907. PMID: 249719.
- Pub.93.** W. Meng, B. Luan, N. Lyle, **R.V. Pappu**, D.P. Raleigh. (2013). The denatured state ensemble contains significant local and long-range structure under native condition: Analysis of the N-terminal domain of the ribosomal protein L9. *Biochemistry*, **52**: 2662-2671. PMID: 23480024.
- Pub.94.** W. Meng\*, N. Lyle\*, B. Luan, D.P. Raleigh, **R.V. Pappu**. (2013). Experiments and simulations show how long-range contacts can form in expanded unfolded proteins with negligible secondary structure. *Proceedings of the National Academy of Sciences USA*. **110**: 2123-2128. PMID: 23341588. \*Co-first authors.
- Pub.95.** R.K. Das, A. Mittal, **R.V. Pappu**. (2013). How is functional specificity achieved through disordered regions of proteins? *BioEssays*, **35**: 17-22. PMID: 23138868.
- Pub.96.** A.H. Mao, N. Lyle, **R.V. Pappu**. (2013). Describing sequence-ensemble relationships for intrinsically disordered proteins. *Biochemical Journal*, **449**: 307-318. PMID: 23240611. (Cover picture)
- Pub.97.** M.M. Babu, R.W. Kriwacki, **R.V. Pappu**. (2012). Versatility from protein disorder. *Science*, **337**: 1460-1461. PMID: 22997313.
- Pub.98.** A.H. Mao, **R.V. Pappu**. (2012). Crystal lattice properties fully determine short-range interaction parameters for alkali and halide ions. *The Journal of Chemical Physics*. **137**: 064104(1-9). PMID: 22897252.
- Pub.99.** A. Radhakrishnan, A. Vitalis, A.H. Mao, A.T. Steffen, **R.V. Pappu**. (2012). Improved atomistic Monte Carlo simulations demonstrate that poly-L-proline adopts heterogeneous ensembles of conformations of semi-rigid segments interrupted by kinks. *Journal of Physical Chemistry B*, **116**: 6862-6871. PMID: 22329658.
- Pub.100.** R.K. Das, A.H. Mao, **R.V. Pappu**. (2012). Unmasking functional motifs within disordered regions of proteins. *Science Signaling*, **5**: pe17. PMID: 22510467.
- Pub.101.** R.K. Das, S.L. Crick, **R.V. Pappu**. (2012). N-terminal segments modulate the  $\alpha$ -helical

propensities of the intrinsically disordered basic regions of bZIP proteins. *Journal of Molecular Biology*, **416**: 287-299. PMID: 22226835.

- Pub.102.** S.L. Crick, **R.V. Pappu**. (2012). Thermodynamic and Kinetic Models for Aggregation of Intrinsically Disordered Proteins. *Book chapter in Peptide Folding, Misfolding, and Nonfolding*. Pg., 413-440. Ed. Reinhard Schweitzer-Stenner, Vladimir Uversky. John Wiley & Sons, Hoboken, NJ.
- Pub.103.** A. Vitalis, **R.V. Pappu**. (2011). Assessing the contribution of heterogeneous distributions of oligomers to aggregation mechanisms of polyglutamine peptides. *Biophysical Chemistry*, **159**: 14-23. PMID: 21530061.
- Pub.104.** R. Halfmann, S. Alberti, R. Krishnan, N. Lyle, C.W. O'Donnell, O.D. King, B. Berger, **R.V. Pappu**, S. Lindquist. (2011). Opposing effects of glutamine and asparagine govern prion formation by intrinsically disordered proteins. *Molecular Cell*, **43**: 72-84. PMID: 21726811.
- Pub.105.** A.H. Mao, **R.V. Pappu**. (2011). Exact recording of Metropolis-Hastings-class Monte Carlo simulations using one bit per sample. *Computer Physics Communications*. **182**: 1452-1454.
- Pub.106.** D.G. Thomas, **R.V. Pappu**, Baker, NA. (2011). NanoParticle ontology for cancer nanotechnology research. *Journal of Biomedical Informatics*. **44**: 59-74. PMID: 20211274.
- Pub.107.** M.A. Wyczalkowski, A. Vitalis, **R.V. Pappu**. (2010). New estimators for calculating solvation entropy and enthalpy and comparative assessments of their accuracy and precision. *Journal of Physical Chemistry B*, **114**: 8166-8180. PMID: 20503993.
- Pub.108.** A.H. Mao, S.L. Crick, A. Vitalis, C. Chicoine, **R.V. Pappu**. (2010). Net charge per residue modulates conformational ensembles of intrinsically disordered proteins. *Proceedings of the National Academy of Sciences USA*, **107**: 8183-8188. PMID: 20404210.
- Pub.109.** T.E. Williamson, A. Vitalis, S.L. Crick, **R.V. Pappu**. (2010). Modulation of polyglutamine conformations and dimer formation by the N-terminus of Huntingtin. *Journal of Molecular Biology*, **396**: 1295-1309. PMID: 20026071.
- Pub.110.** X. Hu, S.L. Crick, G. Bu, C. Frieden, **R.V. Pappu**, J-M. Lee. (2009). Amyloid seeds formed by cellular uptake, concentration, and aggregation of the amyloid-beta peptide. *Proceedings of the National Academy of Sciences USA*, **106**: 20324-20329. PMID: 19910533.
- Pub.111.** D.G. Thomas, **R.V. Pappu**, N.A. Baker. (2009). NPO: Ontology for Cancer Nanotechnology Research. *Nature Precedings*. EMBC 2009. <http://dx.doi.org/10.1109/IEMBS.2009.5333941>.
- Pub.112.** A.A. Chen, M. Marucho, N.A. Baker, **R.V. Pappu**. (2009). Simulations of RNA interactions with monovalent ions. *Methods in Enzymology*, **469**: 406-426. PMID: 2094680.
- Pub.113.** A. Vitalis, **R.V. Pappu**. (2009). Methods for Monte Carlo simulations of biomacromolecules. *Annual Reports in Computational Chemistry*. **5**: 49-76. PMID: 2042847.
- Pub.114.** D.G. Thomas, **R.V. Pappu**, N.A. Baker. (2009). NPO: Ontology for Cancer Nanotechnology Research. *Nature Precedings*. EMBC 2009. Annual International Conference of the IEEE. <http://dx.doi.org/10.1109/IEMBS.2009.5333941>.
- Pub.115.** A. Vitalis, N. Lyle, **R.V. Pappu**. (2009). Thermodynamics of beta sheet formation in polyglutamine. *Biophysical Journal*, **97**: 303-311. PMID: 19580768. *Feature Article*.
- Pub.116.** A.A. Chen, D.E. Draper, **R.V. Pappu**. (2009). Molecular simulation studies of monovalent counterion-mediated interactions in a model RNA kissing loop. *Journal of Molecular Biology*, **390**: 805-819. PMID: 19482035.

- Pub.117.** A. Vitalis, **R.V. Pappu**. (2009). ABSINTH: A new continuum solvation model for simulations of polypeptides in aqueous solutions. *Journal of Computational Chemistry*, 30: 673-700. PMID: 18506808. *Cover picture*.
- Pub.118.** A. Vitalis, X. Wang, **R.V. Pappu**. (2008). Atomistic simulations of the effects of polyglutamine chain length and solvent quality on conformational equilibria and spontaneous homodimerization. *Journal of Molecular Biology*, **384**: 279-297. PMID: 18824003.
- Pub.119.** H.T. Tran, A. Mao, **R.V. Pappu**. (2008). Role of backbone-solvent interactions in determining conformational equilibria of intrinsically disordered polypeptides. *Journal of the American Chemical Society*, **130**: 7380-7392. PMID: 18481860.
- Pub.120.** M. A. Wyczalkowski, **R.V. Pappu**. (2008). Satisfying the fluctuation theorem in free energy calculations with Hamiltonian Replica Exchange. *Physical Review E*, **77**: 026104. PMID: 18352087.
- Pub.121.** **R.V. Pappu**, X. Wang, A. Vitalis, S.L. Crick. (2008). A polymer physics perspective on driving forces and mechanisms for protein aggregation. *Archives of Biochemistry and Biophysics*, **469**: 132-141. PMID: 17931593.
- Pub.122.** A.A. Chen, **R.V. Pappu**. (2007). Parameters of monovalent ions in the AMBER-99 forcefield: Assessment of inaccuracies and proposed improvements. *Journal of Physical Chemistry B*, **111**: 11884-11887. PMID: 17887792.
- Pub.123.** A. Vitalis, X. Wang, **R.V. Pappu**. (2007). Quantitative characterization of intrinsic disorder in polyglutamine: Insights from analysis based on polymer theories. *Biophysical Journal*, **93**: 1923-1937. PMID: 17526581.
- Pub.124.** A.A. Chen, **R.V. Pappu**. (2007). Quantitative characterization of ion pairing and cluster formation in strong 1:1 electrolytes. *Journal of Physical Chemistry B*, **111**: 6469-6478. PMID: 17526581.
- Pub.125.** S.L. Crick, M. Jayaraman, C. Frieden, R. Wetzel, **R.V. Pappu**. (2006). Fluorescence correlation spectroscopy shows that monomeric polyglutamine molecules form collapsed structures in aqueous solutions. *Proceedings of the National Academy of Sciences USA*, **103**: 1674-1679. PMID: 17075061.
- Pub.126.** H.T. Tran, **R.V. Pappu**. (2006). Toward an accurate theoretical framework for describing ensembles for proteins under strongly denaturing conditions. *Biophysical Journal*, **91**: 1868-1886. PMID: 16766618.
- Pub.127.** X. Wang, A. Vitalis, M.A. Wyczalkowski, **R.V. Pappu**. (2006). Characterizing the conformational ensemble of monomeric polyglutamine. *Proteins: Structure, Function and Bioinformatics*, **63**: 297-311. PMID: 16299774.
- Pub.128.** H.T. Tran, X. Wang, **R.V. Pappu**. (2005). Reconciling observations of sequence-specific conformational preferences with the generic behavior of denatured proteins. *Biochemistry*, **44**: 11369-11380. PMID: 16114874.
- Pub.129.** A. Patriciu, G.S. Chirikjian, **R.V. Pappu**. (2004). Analysis of the conformational dependence of mass-metric tensor determinants in serial polymers with constraints. *Journal of Chemical Physics*, **121**: 12708-12720.
- Pub.130.** A.N. Drozdov, A. Grossfield, **R.V. Pappu**. (2004). The role of solvent in determining conformational preferences of alanine dipeptide in water. *Journal of the American Chemical Society*, **126**: 2574-2581. PMID: 14982467.
- Pub.131.** **R.V. Pappu**, G.D. Rose. (2002). A simple model for polyproline II structure in unfolded

states of alanine-based peptides. *Protein Science*, **11**: 2437-2455.

- Pub.132.** R.V. Pappu, R. Srinivasan, G.D. Rose. (2000). The Flory isolated pair hypothesis is not valid for polypeptide chains: Implications for protein folding. *Proceedings of the National Academy of Sciences USA*, **97**: 12565-12570.
- Pub.133.** R.K. Hart, R.V. Pappu, J.W. Ponder. (2000). Exploring the similarities between potential smoothing and simulated annealing. *Journal of Computational Chemistry*, **97**: 12565-12570.
- Pub.134.** R.V. Pappu, G.R. Marshall, J.W. Ponder. (1999). A potential smoothing algorithm accurately predicts transmembrane helix packing. *Nature Structural Biology*, **6**: 50-55.
- Pub.135.** R.V. Pappu, R.K. Hart, J.W. Ponder. (1998). Analysis and application of potential energy smoothing and search methods for global optimization. *Journal of Physical Chemistry B*, **102**: 9725-9742.
- Pub.136.** E.S. Huang, P. Koehl, M. Levitt, R.V. Pappu, J.W. Ponder. (1998). Accuracy of side-chain prediction upon near-native protein backbones generated by *ab initio* folding Methods. *Proteins: Structure, Function, and Genetics*, **33**: 204-217.
- Pub.137.** R.V. Pappu, D.L. Weaver. The early folding kinetics of apomyoglobin. (1998). *Protein Science*, **7**: 480-9742
- Pub.138.** R.V. Pappu, W.J. Schneller, D.L. Weaver. (1996). Electrostatic multipole representation of a polypeptide chain: An algorithm for simulation of polypeptide properties. *Journal of Computational Chemistry*, **17**: 1033-1045.

#### **Commentaries, editorials, meeting reviews, and perspectives**

- Com. 1.** C. D. Keating, R. V. Pappu. (2021). Liquid-liquid phase separation: A widespread and versatile way to organize aqueous solutions. *Journal of Physical Chemistry B*, **125**: 12399-12340.
- Com. 2.** J.D. Kahn, E.A. Lemke, R.V. Pappu (2021). Faces, facets, and functions of biomolecular condensates driven by multivalent proteins and nucleic acids. *Biophysical Journal*, **120**: E1-E4.
- Com. 3.** R.V. Pappu. (2020). Phase separation – a physical mechanism for organizing information and biochemical reactions. *Developmental Cell*, **55**: 1-3.
- Com. 4.** A.E. Posey, R.V. Pappu. (2018). A first glimpse of nucleation of phase transitions in living cells. (*Invited preview*). *Molecular Cell*, **71**: 1-3.
- Com. 5.** P. Sormanni, D. Piovesan, G. Heller, M. Bonomi, P. Kukic, C. Camilloni, M. Fuxreiter, Z. Dosztanyi, R. Pappu, M. M. Babu, S. Longhi, P. S. Tompa, A.K. Dunker, V.N. Uversky, S. Tosatto, M. Vendruscolo. (2017). Simultaneous quantification of protein order and disorder. *Nature Chemical Biology*, Commissioned Commentary, **13**: 339-342.
- Com. 6.** A. S. Holehouse, R.V. Pappu. (2017). FUS zigzags its way to cross beta. *Cell*, **171**: 499-500.
- Com. 7.** T.S. Harmon, A.S. Holehouse, R.V. Pappu. (2017). To mix, or to demix, that is the question. *Biophysical Journal*, **112**: 565-567, Invited New & Notable piece.
- Com. 8.** J. Clarke, R.V. Pappu. Protein folding and binding, complexity comes of age. (2017). *Current Opinion in Structural Biology*, **42**: 5-7.
- Com. 9.** A.S. Holehouse, R.V. Pappu. Encoding phase transitions. (2015). *Nature Materials*. **14**: 1083-1084. Invited News & Views piece.

- Com. 10. R.V. Pappu** (2015). Cell signaling, division, and organization mediated by intrinsically disordered proteins. *Seminars in Cell and Developmental Biology*. **37**: 1-2.
- Com. 11. R.V. Pappu**. (2014). Frozen in Beta. *Biophysical Journal*. **107**: 795-797. Invited New & Notable Piece.
- Com. 12.** A.K. Dunker et al. (2013). What's in a name? Why these proteins are called intrinsically disordered? *Intrinsically Disordered Proteins*. **1**: e24157.
- Com. 13.** H.A. Lashuel, **R.V. Pappu**. (2009). Amyloids Go Genomic: Insights Regarding the Sequence Determinants of Prion Formation from Genome-Wide Studies. *ChemBioChem*, **10**: 1951-1954. PMID: 19598186.
- Com. 14. R.V. Pappu**, R. Nussinov. (2009). Protein folding: Lessons learned and new frontiers. *Physical Biology* **6**: 010301-1. PMID: 19208944.
- Com. 15. R.V. Pappu**. Review of the Fourth Johns Hopkins Protein Folding Meeting. (1999). *Proteins: Structure Function, and Genetics*, **36**: 263-269.

### **Submitted Manuscripts / preprints**

- Sub.-01.** M. Feric, A. Sarfallah, F. Dar, D. Temiakov, **R.V. Pappu**, T. Misteli. Mesoscale structure-function relationships in mitochondrial transcriptional condensates. *Proceedings of the National Academy of Sciences USA*, revised version under review.
- Sub.-02.** Y. Dai, D. Lee, X. Zeng, M. Farag, K. Kim, H-i. Son, X. Guo, M. Ney, D.M. Shapiro, **R.V. Pappu**, A. Chilkoti, L. You. Programmable synthetic biomolecular condensates for cellular control. *Nature Chemical Biology*, revised version being prepared following first round of reviews.
- Sub.-03.** M. Farag, S.R. Cohen, A. Bremer, W.M. Borchers, T. Mittag, **R.V. Pappu**. Condensates of disordered proteins have small-world network structures and interfaces defined by expanded conformations. *Revised version submitted to Nature Physics*.
- Sub.-04.** M-K. Shinn, M.C. Cohan, J.L. Bullock, K.M. Ruff<sup>†</sup>, P. A. Levin<sup>†</sup>, **R.V. Pappu**<sup>†</sup>. Connecting sequence features within the disordered C-terminal linker of *B. subtilis* FtsZ to molecular functions and bacterial cell division. (<sup>†</sup>Co-corresponding authors). *Proceedings of the National Academy of Sciences USA*, revised version being prepared following first round of reviews.

### **Manuscripts in preparation**

- Prep.01. R.V. Pappu**, S. R. Cohen, F. Dar, M. Farag, M. Kar. Phase transitions of associative macromolecules. *In preparation for Chemical Reviews*.
- Prep.02.** M.R. King, A.Z. Lin, K.M. Ruff, M. Farag, W. Ouyang, M.D. Vahey, E. Lundberg, **R.V. Pappu**. Reverse engineering nucleolar fibrillar centers as charge-complexation driven macromolecular condensates.
- Prep.03.** G. M. Wadsworth<sup>§</sup>, W.J. Zahurancik<sup>§</sup>, X. Zeng<sup>§</sup>, P. Pullara, L. B. Lai, V. Sidharthan<sup>2</sup>, **R.V. Pappu**<sup>\*</sup>, V. Gopalan<sup>\*</sup>, P.R. Banerjee<sup>\*</sup>. (<sup>§</sup>Co-first authors; <sup>\*</sup>Co-corresponding authors). Molecular Basis of RNA Condensation into Percolated Network Fluids.
- Prep.04.** X. Zeng, **R.V. Pappu**. Simulations based on a polarizable forcefield show that amino acid interactions are different in dilute vs. dense phases of biomolecular condensates.
- Prep.05.** A. Bremer<sup>§</sup>, A.E. Posey<sup>§</sup>, M. Borgia, W.M. Borchers, **R.V. Pappu**<sup>†</sup>, T. Mittag<sup>†</sup>. Quantifying coexisting concentrations of individual components in multicomponent phase separating systems. *In preparation for Biomolecules*. (<sup>§</sup>Co-first authors; <sup>†</sup>Co-corresponding

authors).

- Prep.06.** A.Z. Lin, K.M. Ruff, A. Jalihal, A. E. Posey, F. Dar, M.R. King, J.M. Lalmansingh, A. S. Gladfelter\*, **R. V. Pappu\***. (\*Co-corresponding authors). Demixing of distinct ribonucleoprotein condensates is under dynamical control. (\*Co-corresponding authors).
- Prep.07.** M. J. Fossat<sup>§</sup>, A.E. Posey<sup>§</sup>, **R.V. Pappu**. Uncovering the complex contributions to the stability of single alpha helix forming sequences. (<sup>§</sup>Co-first authors).
- Prep.08.** G. Chauhan, F. Dar, **R.V. Pappu**. Effects of crowders on phase separation of associative macromolecules.
- Prep.09.** M. Farag, A. Bremer, W.M. Borchers, T. Mittag<sup>†</sup>, **R.V. Pappu<sup>†</sup>**. Electrostatic interactions contribute to cooperative interplay in co-phase behaviors of mixtures of prion-like low complexity domains. (<sup>†</sup>Co-corresponding authors).
- Prep.10.** S.R. Cohen, M. Farag, **R.V. Pappu**. Modified Rouse-Zimm theory for computing sequence-specific viscoelastic properties of biomolecular condensates.
- Prep.11.** X. Zeng, **R.V. Pappu**. Theoretical and computational studies of macromolecular phase transitions. *Invited review in preparation for Current Opinion in Structural Biology.*
- Prep.12.** F. Dar, M. Kar, A.A. Hyman, **R.V. Pappu**. Physics of associative polymers explains the formation of mesoscopic clusters in subsaturated solutions of phase separating macromolecules.
- Prep.13.** F. Dar, S.R. Cohen, K.M. Ruff, **R.V. Pappu**. Multidimensional phase diagrams of multicomponent systems comprising multivalent macromolecules.
- Prep.14.** F. Dar, K.M. Ruff, **R.V. Pappu**. Linkage of binding and phase equilibria in complex mixtures of ligands and associative macromolecules.
- Prep.15.** F. Dar<sup>§</sup>, J-M. Choi<sup>§</sup>, S.R. Cohen<sup>§</sup>, A. Phillips, D. Mitrea, C.B. Stanley, R.W. Kriwacki<sup>†</sup>, **R.V. Pappu<sup>†</sup>**. Network structure and dynamics of biomolecular condensates formed by phase separation of multivalent proteins. (<sup>§</sup>Co-first authors; <sup>†</sup>co-corresponding authors).
- Prep.16.** T. Wu, M.R. King, M. Farag, **R.V. Pappu**, M.D. Lew. Single-molecule imaging of fluorogenic probes reveals inhomogeneous molecular organization in biomolecular condensates.
- Prep.17.** M.J. Fossat, A.E. Posey, **R.V. Pappu**. Impact of charge regulation on conformational and phase equilibria of intrinsically disordered proteins. *Invited review in preparation as a feature article to Journal of Physical Chemistry B.*
- Prep.18.** **R.V. Pappu**. Physico-chemical principles underlying conformational and functional specificities of intrinsically disordered proteins. *Invited perspective for the Journal of Physical Chemistry B.*
- Prep.19.** M.J. Fossat, **R.V. Pappu**. Sequence patterns that influence charge regulation of peptides.
- Prep.20.** M J. Fossat, X. Zeng and **R. V. Pappu**. Automated identification of stickers versus spacers in disordered proteins that drive phase separation.
- Prep.21.** M.J. Fossat, **R.V. Pappu**. Efficient  $q$ -canonical Monte Carlo simulations of charge regulation.
- Prep.22.** K.M. Ruff<sup>†</sup>, A.Z. Lin<sup>†</sup>, A.S. Gladfelter, **R.V. Pappu**. Impact of orthologous polar tracts on the phase behavior of the Whi3 protein from *Ashbya gossypii*. (<sup>†</sup>Co-first authors).

**Prep.23.** F. Dar, M. Farag, **R.V. Pappu**. Physics of phase transitions and biomolecular condensates. For *Nature Reviews Physics*.

**Prep.24.** K.M. Ruff, M-K. Shinn, **R.V. Pappu**. Physics of intrinsically disordered proteins. *Invited review for Reports on Progress in Physics*.

## **Grants**

### **CURRENT**

**St. Jude Research Collaborative 2.0**, Sponsored by St. Jude Children's Research Hospital,

**Title:** *The biology and Biophysics of RNP granules*

**Funding period:** February 01, 2022 – January 31, 2027

**Role in the project:** *Project Principal Investigator*, Material properties of RNP granules, crosstalk among RNP granules, and molecular grammars underlying nucleolar and nuclear speckle organization

**National Institutes of Health, R01NS121114**

**Title:** *Understanding the sequence and structural determinants of phase behavior of ALS causing proteins*

**Principal Investigators:** Tanja Mittag (St. Jude Children's Research Hospital), Rohit Pappu

**Funding period:** February 01, 2021 – January 31, 2026

**Principal Role in the project:** Co-PI in multi-PI grant

**Air Force Office of Scientific Research, Multidisciplinary University Research Initiative (MURI), FA9550-20-1-0241 Topic 20: Fundamental Design Principles for Engineering Orthogonal Liquid-Liquid Phase Separations in Living Cells**

**Title:** *Uncovering and applying the interfacial design principles of multiphasic natural and synthetic organelles*

**Funding Period:** October 01, 2020 – September 30, 2025

**Principal Investigators:** Clifford P. Brangwynne (contact PI, Princeton University), Jose Avalos (co-PI, Princeton University), Ashutosh Chilkoti (co-PI, Duke University), Amy Gladfelter (co-PI, University of North Carolina), **Rohit Pappu (co-PI, Washington University in St. Louis)**, Lingchong You (co-PI, Duke University)

### **PENDING**

**National Institutes of Health (NINDS), 1 R35 NS132178-01**

**Title:** *Biophysical studies of phase separation and its impact on neurodegeneration*

**Requested funding period:** 04/01/2023 – 03/31/2031

**Role in the project:** *Principal Investigator*

**National Institutes of Health (NINDS), 2R01NS056114-15A1**

**Title:** *Uncovering the interplay between homotypic and heterotypic interactions on the phase behavior of huntingtin*

**Requested funding period:** November 01, 2022 – October 31, 2027

**Role in the project:** *Principal Investigator*

**National Science Foundation, MCB-2227268**

**Title:** *Impact of charge regulation on conformational and phase equilibria of intrinsically disordered proteins*

**Requested funding period:** October 01, 2022 – September 30, 2027

**Role in the project:** *Principal Investigator*

## COMPLETED

### **National Institutes of Health (NINDS), 5R01NS056114-10-14**

**Title:** *Role of chain length and sequence contexts on polyglutamine oligomerization*

**Funding period:** July 01, 2016 – June 30, 2022

**Role in the project:** *Principal Investigator*

**St. Jude Research Collaborative**, Sponsored by St. Jude Children's Research Hospital,

**Title:** *Biology and Biophysics of Membraneless Organelles*

**Funding period:** February 01, 2017 – May 31, 2022

**Role in the project:** *Project Principal Investigator*, Computational & Theoretical Modeling

### **National Institutes of Health, 1R01NS089932**

**Title:** *Mechanism of modulation of huntingtin exon 1 aggregation by profilin*

**Funding period:** April 01, 2016 – December 31, 2021

**Principal Investigators:** **Rohit Pappu (contact PI)**, Marc I. Diamond, and Ralf Langen

**Role in the project:** *Main Principal Investigator* in Multi-PI grant

### **National Science Foundation, DMR 1729783 – DMREF Collaborative Research**

**Title:** *High throughput exploration of sequence space of peptide polymers that exhibit aqueous demixing phase behavior*

**Funding Period:** October 01, 2017 – September 30, 2021

**Principal Investigator:** Ashutosh Chilkoti, Duke University

**Role in the project:** *Co-Principal Investigator* with Stefan Zauscher (Duke University)

### **Human Frontier Science Program (HFSP), RGP0034/2017**

**Title:** *Elucidating the molecular logic of membrane-free compartment function and assembly*

**Funding period:** September 01, 2017 – August 31, 2021

**Role in the project:** *Co-Principal Investigator* with Simon Alberti (Max Planck Institute, Dresden) and Stephen W. Michnick (University of Montreal)

### **National Science Foundation, MCB-1614766**

**Title:** *Multiscale Modeling of Phase Transitions Driven by Multivalency and Disordered Proteins*

**Funding period:** July 15, 2016 – July 14, 2021

**Role in the project:** *Principal Investigator*

### **Dewpoint Therapeutics, Sponsored Research Agreement**

**Title:** *Cataloging and characterizing biomolecular condensates*

**Funding Period:** November 01, 2019 – October 31, 2020

**Role in the project:** *Principal Investigator*

### **National Institutes of Health, 1R01GM108785**

**Title:** *Signal transduction by ERBB2 / ERBB3 oligomers*

**Funding period:** October 01, 2013 – March 31, 2017

**Principal Investigator:** Linda J. Pike

**Role in the project:** *Co-Investigator*

### **National Institutes of Health (NINDS), 5R01NS056114**

**Title:** *Role of chain length and sequence contexts on polyglutamine oligomerization*

**Funding period:** July 01, 2011 – June 30, 2016

**Role in the project:** PI



**National Science Foundation, MCB-0718924**

**Title:** *Phase behavior of intrinsically disordered proteins*  
**Funding period:** September 01, 2011 – August 31, 2015  
**Role in the project:** Principal Investigator

**National Institutes of Health, 1S10OD018091 Shared Instrumentation Grant**

**Title:** *GPU computing resource to enable innovation in imaging and network biology*  
**Funding period:** April 01, 2014 – March 31, 2015  
**Role in the project:** Co-PI with Fred Prior

**National Institutes of Health (NINDS), 5R01NS056114**

**Title:** *Atomistic studies of nucleation and oligomerization in polyglutamine aggregation*  
**Funding period:** April 15, 2007 – June 30, 2012  
**Role in the project:** PI

**National Science Foundation, MCB-0718924**

**Title:** *Conformational equilibria of intrinsically disordered proteins*  
**Funding period:** September 01, 2007 – August 31, 2011  
**Role in the project:** PI

**Hope Center for Neurological Disorders, Washington University School of Medicine**

Translational Neuroscience Pilot Project  
**Title:** *Mechanism of Huntingtin Aggregation Regulated by Profilin*  
**Funding period:** June 01, 2011 – May 31, 2013  
**Role in the project:** Principal Investigator  
**Co-Investigator:** Marc Diamond

**National Institutes of Health (NCI) U54 CA-119342**

**Title:** *An informatics resource for targeted nanoparticle therapeutics*  
NCI Center grant to the Siteman Center for Cancer Nanotechnology Excellence (Center grant  
**PI:** Samuel Wickline)  
**Funding period:** February 01, 2006 – January 31, 2011  
**Role in the project:** Project Principal Investigator  
**Project Co-Investigators:** David Sept, Nathan Baker

**Pfizer Inc., St. Louis, MO**

**Title:** *Modeling the aggregation of therapeutic monoclonal antibodies*  
**Funding period:** October 31, 2009 – September 30, 2010  
**Role in the project:** Project Principal Investigator

**National Institutes of Health (NCI) Integrated Cancer Research Workspace 94358NBS23**

*Subcontract for with Booz Allen Hamilton for Nanotechnology working group*  
**Funding period:** April 01, 2008 – February 14, 2009  
**Role in the project:** Principal Investigator

**National Science Foundation, MCB-0416766**

**Title:** *Studying the origin of conformational preferences in unfolded proteins*  
**Funding period:** September 01, 2004 – August 31, 2007  
**Role in the project:** Principal Investigator

**Hope Center for Neurological Disorders, Washington University School of Medicine**

Translational Neuroscience Pilot Project  
**Title:** *Investigation of structural changes induced in amyloid A $\beta$  fibrils by polyphenols*  
**Funding period:** January 01, 2007 – December 31, 2007  
**Role in the project:** Co-Investigator (PI: Jin-Moo Lee)

**Fidelity Foundation**

**Title:** *Studies on the process of aggregation in Huntington's disease*

**Funding period:** January 01, 2006 – December 31, 2006

**Role in the project:** Principal Investigator

**March of Dimes Birth Defects Foundation, Basil O'Connor Starter Scholar Award**

**Title:** *Factors that determine amyloid formation in polyglutamine disorders*

**Funding period:** February 01, 2004 – June 30, 2006

**Role in the project:** Principal Investigator

**National Institutes of Health, NIA P50 AG05681-20**

Pilot grant from Alzheimer's Disease Research Center, Washington University

**Title:** *Toward a molecular understanding of polyglutamine disorders*

**Funding period:** May 01, 2003 – April 30, 2004

**Role in the project:** Principal Investigator

**RESEARCH MENTORING**

***Current Postdoctoral and Research Scientists***

1. **Samuel R. Cohen**, Postdoctoral Scientist
2. **Gaurav Chauhan**, Postdoctoral Scientist
3. **Furqan Dar**, Postdoctoral Scientist in waiting
4. **Martin J. Fossat**, Postdoctoral Scientist
5. **Matthew R. King**, Postdoctoral Scientist
6. **Ammon E. Posey**, Senior Research Scientist
7. **Kiersten M. Ruff**, Research Scientist
8. **Xiangze Zeng**, Postdoctoral Scientist

***Current Doctoral Students (alphabetical order)***

1. **Mina Farag**, MD / PhD Student, Department of Biomedical Engineering, Projected graduation date, June 2023.
2. **Andrew Z. Lin**, Doctoral Student, Division of Biology & Biomedical Sciences, Program Plant and Microbiology. Projected graduation date, between December 2022 and March 2023.

***Current Research Staff (alphabetical order)***

1. **Catherine Kornacki**, Laboratory Research Technician, August 2019 onward.
2. **Jared M. Lalmansingh**, Scientific programmer and systems administrator, December 2021 onward.

***Lab alumni – reverse chronological order***

1. **Furqan Dar**, Doctoral Student, Department of Physics, June 2017 – July 2022.

2. **Kaitlyn Hardesty**, Undergraduate student in the Department of Biomedical Engineering. February 2019 – April 2022
3. **Jared M. Lalmansingh**, Doctoral Student, Department of Physics. June 2016 - September 2021.
4. **Megan C. Cohan**, Doctoral Student, Department of Biomedical Engineering, May 2016 – December 2020.
5. **Max V. Staller**, Co-mentored Postdoctoral Scientist (primary mentor: Barak A. Cohen), March 2015 – December 2020.
6. **Anna M.P. Eddelbuettel**, Undergraduate researcher, May 2018 – May 2020.
7. **Alex S. Holehouse**, Doctoral Student, Computational and Molecular Biophysics, May 2013 – May 2017; postdoctoral scientist, June 2017 – December 2019.
8. **Garrett Ginell**, Junior Computational Research Scientist, August 2018 – August 2019
9. **Jeong-Mo Choi**, Postdoctoral Scientist, August 2016 – April 2019.
10. **Mary O. G. Richardson**, Junior Research Scientist and Scientific Programmer, August 2017 – June 2018.
11. **Sang Eun Jee**, Postdoctoral Scientist, November 2016 – October 2017.
12. **Kourtney L. Kroll**, Undergraduate researcher, Summer 2017.
13. **Divya Natarajan**, MD Student researcher, Washington University School of Medicine, summer 2017.
14. **Tyler S. Harmon**, Doctoral Student, Department of Physics. Received PhD in April 2017. Currently, postdoctoral scientist at the Max Planck Institute in Dresden, Germany.
15. **Rajni Verma**, Postdoctoral Scientist, October 2015 – June 2016.
16. **Rahul K. Das**, Postdoctoral Scientist, September 2009 – August 2015.
17. **Anuradha Mittal**, Postdoctoral Scientist. Currently, a senior Bioinformatics Scientist at Affymetrix, San Francisco, CA.
18. **Laruen M. Bedell**, Undergraduate Student, Department of Biomedical Engineering.
19. **Kanchan Garai**, Research Assistant Professor and Research Scholar, August 2013 – May 2014.
20. **James Ahad**, Undergraduate student, Biomedical Engineering. Currently, an MSTP student at Case Western University School of Medicine.
21. **Scott L. Crick**, Doctoral Student, Biomedical Engineering. Received Ph.D. in August 2011. Completed a two-year Postdoc in the lab in July 2013.
22. **Siddique J. Khan**, Postdoc, April 2012 – May 2013.
23. **Nicholas Lyle**, Doctoral Student, Computational & Systems Biology Program, Division of Biology & Biomedical Sciences. Received Ph.D. in May 2013.

24. **Tony Wang**, Summer undergraduate researcher, Summer 2012.
25. **Marta Wells**, Summer undergraduate research, Summer 2011 and 2012.
26. **Albert H. Mao**, M.D.-Ph.D. student, Computational & Molecular Biophysics Program. Received Ph.D. in August 2012.
27. **Jordan Nick**, Summer HHMI undergraduate fellow, Summer 2011.
28. **Kelly Culhane**, SURF student, Summer 2011. Currently, a Ph.D. student in Biochemistry & Biophysics at Yale University.
29. **Aditya Radhakrishnan**, Master's student (BS/MS), Summer 2010 – Summer 2011.
30. **Nil Gural**, Undergraduate researcher, Spring 2011. Currently Ph.D. student in the Harvard-MIT Health Sciences Program.
31. **Adam T. Steffen**, Scientific programmer, Summer 2007 – December 2010.
32. **Alexander French**, Undergraduate researcher, Summer 2010.
33. **Anil Kumar**, Postdoctoral scientist, December 2009 – August 2010.
34. **Caitlin L. Chicoine**, Undergraduate researcher, Summer of 2009,
35. **Matthew A. Wyczalkowski**, Biomedical Engineering. Received his Ph.D. in December 2009.
36. **Tim E. Williamson**, Molecular Biophysics Program, Division of Biology & Biomedical Sciences and Staff Scientist. Received MS in May 2009.
37. **Andreas Vitalis**, Doctoral Student, Molecular Biophysics Program, Division of Biology & Biomedical Sciences. Received his Ph.D. in June 2009.
38. **Alan A. Chen**, Doctoral Student, Molecular Biophysics Program, Division of Biology & Biomedical Sciences. Received his Ph.D. in May 2009.
39. **Jose Pulido**, Undergraduate Trainee, May 2008 – October 2008.
40. **Xiaoling Wang**, Postdoctoral scientist, September 2004 – February 2008.
41. **Hoang T. Tran**, Doctoral student, Biomedical Engineering. Received Ph.D. in December 2007.
42. **Alexander N. Drozdov**, Postdoctoral Scientist, September 2002 – April 2004.
43. **Magdalena Fus**, Undergraduate Trainee, September 2004 – May 2005.
44. **Tirath Patel**, Undergraduate Trainee, September 2004 – May 2005.

#### ***Awards & Honors to Members of the Lab – Reverse Chronological Order***

- Dr. Martin J. Fossat, postdoc in the Pappu lab, was chosen to give a talk and chair a platform session at the 66<sup>th</sup> Annual Meeting of the Biophysical Society in San Francisco, CA – February 2022.
- Dr. Matthew R. King, postdoc in the Pappu lab, received the postdoctoral award from the Intrinsically Disordered Proteins subgroup of the US Biophysical society. The award, sponsored by Molecular Kinetics, comes with a cash prize and a speaking engagement at the 2021 Subgroup Symposium as part of the annual meeting of the Biophysical Society.
- Dr. Ammon E. Posey, senior research scientist in the Pappu lab, was chosen to give a platform talk at the 65<sup>th</sup> Annual Meeting of the Biophysical Society (held virtually in February 2021).

- Dr. Ammon E. Posey, senior research scientist in the Pappu lab, received the 2020 Agilent award for Scientific Innovation.
- Ms. Megan C. Cohan, graduate student in the Pappu lab, received the Ceil M. DeGutis prize in Chemical Biology and Medicinal Chemistry for 2020. This award is given by Washington University in St. Louis in recognition of a graduate student's outstanding contributions to Chemical Biology and Medicinal Chemistry, broadly defined. Ms. Cohan was recognized for her research dedicated to understanding how intrinsically disordered regions (IDRs) might contribute to the molecular functions of bacterial proteins.
- Ms. Anna M.P. Eddelbuettel, undergraduate student researcher in the Pappu lab, received the Outstanding Senior Award for Academic Excellence, and the Outstanding Senior Achievement Award from the Department of Biomedical Engineering and Washington University in St. Louis.
- Ms. Anna M.P. Eddelbuettel, undergraduate student researcher in the Pappu lab, was awarded a three-year graduate research fellowship from the US National Science Foundation.
- Mr. Furqan Dar, graduate student in the Pappu lab, received a Student Research Achievement Award (SRAA) from the Biopolymers In vivo subgroup for his poster presented at the 2020 Annual Meeting of the Biophysical Society in San Diego, CA.
- Dr. Martin J. Fossat, postdoctoral fellow in the Pappu lab, received an award for best postdoctoral poster at the EMBO Workshop on Intrinsically Disordered Proteins held in Bengaluru, India, December 2019.
- Ms. Megan C. Cohan, graduate student in the Pappu lab, received a \$500 travel award to attend the 3<sup>rd</sup> Fusion Bacterial Cell Biology Conference in the Bahamas, for February 2020.
- Ms. Megan C. Cohan, graduate student in the Pappu lab, was elected to be the graduate student representative to the council of the Intrinsically Disordered Proteins subgroup of the Biophysical Society for the period between April 01, 2019 and March 31, 2020.
- Dr. Jeong-Mo Choi, postdoctoral fellow in the Pappu lab, received a travel award to attend and present his work at the 63<sup>rd</sup> Annual Meeting of the Biophysical Society, Baltimore, March 2019.
- Ms. Megan C. Cohan, graduate student in the Pappu lab, was elected to the board of BALSAs for the 2019-2020 period. This is the Biotechnology and Life Sciences Advising Group, which is a non-profit organization "that provides consulting services for a variety of clients, ranging from individual faculty members up through multinational corporations".
- Mr. Jared Lalmansingh, physics PhD student in the Pappu lab, received Washington University's 2019 Gerry and Bob Virgil Ethic of Service Award for his contributions to the Young Scientist's Program, an outreach effort to draw students from the inner cities into science.
- Dr. Alex S. Holehouse, postdoc in the Pappu lab, received the 2019 MoISSI "seed" software fellowship from the Molecular Sciences and Software Institute to develop a computational pipeline for modeling the evolution and sequence-ensemble relationships of intrinsically disordered proteins.
- Dr. Max Staller, joint postdoc in the Cohen and Pappu labs, was chosen to give two lectures as part of the Gene Regulatory Networks in Development course at the Molecular Biology Laboratory in Woods Hole, MA in October 2018.
- Mr. Conor O'Neill, first year Biomedical Engineering graduate student in the Pappu lab, was matched with the Kent and Bonnie Lattig fellowship in the Center for Biological Systems Engineering at Washington University in St. Louis for the 2018-2019 academic year.
- Dr. Alex S. Holehouse, postdoctoral fellow in the Pappu lab, received an award for one of the three best posters presented by postdocs at the 2018 Gordon Research Conference on Intrinsically Disordered Proteins held in Les Diablerets, Switzerland.

- Ms. Megan C. Cohan, graduate student in the Pappu lab, was elected by her peers to co-chair the 2020 Gordon Research Seminar that will precede the 2020 Gordon Research Conference on Intrinsically Disordered Proteins.
- Dr. Kiersten M. Ruff, postdoctoral fellow in the Pappu lab, was chosen to give a special talk at the 2018 Gordon Research Conference on Intrinsically Disordered Proteins held in Les Diablerets, Switzerland.
- Ms. Megan C. Cohan, graduate student in the Pappu lab, was chosen to speak at the 2018 Gordon Research Seminar (GRS) that preceded the 2018 Gordon Research Conference on Intrinsically Disordered Proteins in Les Diablerets, Switzerland, July 2018.
- Ms. Megan C. Cohan, graduate student in the Pappu lab, was chosen to receive a travel award, based on her submitted abstract, to present a poster at the EMBO | EMBL Symposium on Cellular Mechanisms Driven by Liquid Phase Separation, May, 2018.
- Dr. Kiersten M. Ruff, postdoctoral fellow in the Pappu lab, was chosen, based on her submitted abstract, to speak at the EMBO | EMBL Symposium on Cellular Mechanisms Driven by Liquid Phase Separation, May, 2018.
- Ms. Mary O.G. Richardson, scientific programmer and junior research scientist in the Pappu lab received the prestigious NSF graduate student fellowship for her PhD studies in Computational Biology.
- Dr. Jeong-Mo Choi, postdoctoral fellow in the Pappu lab, was chosen to speak in a platform session on intrinsically disordered proteins at the 62<sup>nd</sup> Annual Meeting of the Biophysical Society, San Francisco, February 2018.
- Dr. Kiersten M. Ruff, postdoctoral fellow in the Pappu lab, was chosen to speak in a platform session on intrinsically disordered proteins at the 62<sup>nd</sup> Annual Meeting of the Biophysical Society, San Francisco, February 2018.
- Dr. Jeong-Mo Choi, postdoctoral fellow in the Pappu lab, was chosen to give the Molecular Kinetics sponsored postdoctoral talk at the 2018 symposium of the Intrinsically Disordered Proteins subgroup to be held in conjunction with the 62<sup>nd</sup> Annual Meeting of the Biophysical Society, San Francisco, February 2018.
- Dr. Alex S. Holehouse, postdoctoral fellow in the Pappu lab, was one of the invited speakers in the symposium organized by the Biopolymers In Vivo Subgroup at 62<sup>nd</sup> Annual Meeting of the Biophysical Society, San Francisco, February 2018.
- Dr. Alex S. Holehouse, postdoctoral fellow in the Pappu lab, was chosen to give a short talk at the 2018 Protein Folding Dynamics Gordon Research Conference, Galveston, TX, January 2018.
- Ms. Megan C. Cohan, Biomedical Engineering Graduate Student in the Pappu Lab, received a travel award to attend the 2017 annual meeting of the Biomedical Engineering Society to be held in Phoenix, AZ, October 2017.
- Dr. Kiersten M. Ruff, postdoctoral fellow in the Pappu Lab, was chosen to give a short talk at the 2017 FASEB Science Research Conference on Protein Aggregation in Health and Disease in Steam Boat Springs, CO, June 2017.
- Ms. Megan C. Cohan, Biomedical Engineering Graduate Student in the Pappu Lab, was chosen to give a student talk at the annual meeting of the NSF sponsored Protein Folding Consortium in Berkeley, CA, June 2017.
- Mr. Alex S. Holehouse, Computational & Molecular Biophysics Graduate Student in the Pappu Lab gave a talk at the weeklong workshop on the Physics of Cellular Adaptation held at the Bellairs Institute in Barbados, April 2017.

- Mr. Alex S. Holehouse, Computational & Molecular Biophysics Graduate Student in the Pappu Lab, Recipient of the Spencer T. and Ann W. Olin for superior accomplishments in biomedical research doctoral students at Washington University, February 2017.
- Mr. Tyler S. Harmon, Physics Graduate Student in the Pappu Lab Recipient of the SRAA Award for Best Poster, 61<sup>st</sup> Annual Meeting of the Biophysical Society, Award Sponsored by the Intrinsically Disordered Proteins Subgroup, February 2017.
- Mr. Alex S. Holehouse, Computational & Molecular Biophysics Graduate Student in the Pappu Lab gave an invited platform session talk and chaired this session at the 61<sup>st</sup> Annual Meeting of the Biophysical Society, February 2017.
- Mr. Alex S. Holehouse, Computational & Molecular Biophysics Graduate Student in the Pappu Lab, received a student speaker award at the 23<sup>rd</sup> Annual retreat of the DBBS Computational & Molecular Biophysics Graduate Program for his talk entitled *Phase separation of intrinsically disordered proteins yields low-density “empty” liquids*.
- Ms. Megan C. Cohan, Biomedical Engineering Graduate Student in the Pappu Lab, received a travel award to attend the fourth biennial Intrinsically Disordered Proteins Gordon Research Conference held in Les Diablerets, Switzerland in June 2016.
- Mr. Alex S. Holehouse, Computational & Molecular Biophysics Graduate Student in the Pappu Lab, received a travel award to attend the fourth biennial Intrinsically Disordered Proteins Gordon Research Conference held in Les Diablerets, Switzerland in June 2016.
- Ms. Kiersten M. Ruff, Computational & Systems Biology Graduate Student in the Pappu Lab, was one of the awardees for best posters presented at the fourth biennial Intrinsically Disordered Proteins Gordon Research Conference held in Les Diablerets, Switzerland in June 2016.
- Mr. Alex S. Holehouse, Computational & Molecular Biophysics Graduate Student in the Pappu Lab was elected as co-chair of the 2018 Graduate Research Seminar that is to accompany the fifth biennial Intrinsically Disordered Proteins Gordon Research Conference.
- Mr. Tyler S. Harmon, Physics Graduate Student in the Pappu Lab was named as one of the CBSE Graduate Student Scholar by the Center for Biological Systems Engineering at Washington University for the period between July 01, 2016 and June 30, 2017.
- Mr. Alex S. Holehouse, Computational & Molecular Biophysics Graduate Student in the Pappu Lab was named as the Kent and Bonnie Lattig CBSE Graduate Student Scholar by the Center for Biological Systems Engineering at Washington University for the period between July 01, 2016 and June 30, 2017.
- Mr. Alex S. Holehouse, Computational & Molecular Biophysics Graduate Student in the Pappu Lab selected to give an invited talk at the Gordon Research Seminar preceding the Gordon Research Conference on Intrinsically Disordered Proteins, Les Diablerets, Switzerland, June 2016.
- Mr. Alex S. Holehouse, Computational & Molecular Biophysics Graduate Student in the Pappu Lab gave an invited platform session talk at the 60<sup>th</sup> Annual Meeting of the Biophysical Society, February 2016.
- Mr. Tyler S. Harmon, Physics Graduate Student in the Pappu Lab gave an invited platform session talk at the 60<sup>th</sup> Annual Meeting of the Biophysical Society, February 2016.
- Ms. Kiersten M. Ruff, Computational & Systems Biology Graduate Student in the Pappu Lab, was named the first Kent and Bonnie Lattig CBSE Graduate Student Scholar by the Center for Biological Systems Engineering at Washington University in St. Louis for the period between July 2015 and June 2016.

- Mr. Tyler S. Harmon, Physics Graduate Student in the Pappu Lab, was chosen to give the opening talk at the 2015 edition of the annual meeting of the NSF sponsored Protein Folding Consortium, Berkeley, May 2015.
- Ms. Kiersten M. Ruff, Computational & Systems Biology Graduate Student in the Pappu Lab, was reappointed as a CBSE Graduate Student Scholar by the Center for Biological Systems Engineering at Washington University in St. Louis for the period between July 2015 and June 2016.
- Ms. Kiersten M. Ruff, Computational & Systems Biology Graduate Students in the Pappu Lab was chosen to speak at the Princeton Workshop on Intracellular Phase Transitions, April 2015.
- Mr. Alex S. Holehouse, Computational & Molecular Biophysics Graduate Student in the Pappu Lab, Recipient of the SRAA Award for Best Poster, 59<sup>th</sup> Annual Meeting of the Biophysical Society, Award Sponsored by the Intrinsically Disordered Proteins Subgroup, February 2015.
- Ms. Kiersten M. Ruff, Computational & Systems Biology Graduate Student in the Pappu Lab, selected to deliver a platform session talk at the 59<sup>th</sup> annual meeting of the Biophysical Society, Baltimore, MD, February 2015.
- Ms. Kiersten M. Ruff, Computational & Systems Biology Graduate Student in the Pappu Lab, was appointed as a CBSE Graduate Student Scholar by the Center for Biological Systems Engineering at Washington University in St. Louis for the period between July 2014 and June 2015.
- Ms. Kiersten M. Ruff, Computational & Systems Biology Graduate Student in the Pappu Lab, selected to speak at the first Graduate Research Seminar preceding the 3<sup>rd</sup> Gordon Research Conference on Intrinsically Disordered Proteins, Stonehill College, MA, June 2014.
- Mr. Albert H. Mao, MSTP and Computational & Molecular Biophysics Graduate Student in the Pappu Lab, received Washington University's Spencer T. Olin prize for outstanding graduate research, April 2014.
- Mr. Alex S. Holehouse, Computational & Molecular Biophysics Graduate Student in the Pappu Lab, Recipient of the SRAA Award for Best Poster, 58<sup>th</sup> Annual Meeting of the Biophysical Society, Award Sponsored by the Intrinsically Disordered Proteins Subgroup, February 2014.
- Dr. Anuradha Mittal, Postdoc in the Pappu Lab, selected to give a platform session talk at the 58<sup>th</sup> Annual Meeting of the Biophysical Society, San Francisco, February 2014.
- Ms. Kiersten M. Ruff, Computational & Systems Biology Graduate Student in the Pappu Lab, Recipient of the SRAA Award for Best Poster, 58<sup>th</sup> Annual Meeting of the Biophysical Society, Award Sponsored by the Intrinsically Disordered Proteins Subgroup, February 2014.
- Ms. Kiersten M. Ruff, Computational & Systems Biology Graduate Student in the Pappu Lab, Received Honorable Mention from National Science Foundation in response to Graduate Student Fellowship, with Enhanced Access to Cyberinfrastructure Resources, Including XSEDE Supercomputing Time to Support Research Toward Completion of Graduate Program, 2013.
- Ms. Kiersten M. Ruff, Computational & Systems Biology Graduate Student in the Pappu Lab, Recipient of the SRAA Award for Best Poster, 57<sup>th</sup> Annual Meeting of the Biophysical Society, Award Sponsored by the Intrinsically Disordered Proteins Subgroup, 2013.
- Dr. Scott L. Crick, Recipient of the National Institutes of Health, National Research Service Award for Postdoctoral Research following the completion of thesis work and a two-year postdoctoral stint in the Pappu Lab, 2013.
- Mr. Nicholas Lyle, Computational & Systems Biology Graduate Student, Best Poster Award, Intrinsically Disordered Proteins, Gordon Research Conference, 2012.



- Dr. Scott L. Crick, Postdoc in the Pappu Lab, Selected to deliver a Platform Session Talk at the 56<sup>th</sup> Annual Meeting of the Biophysical Society, San Diego, CA, 2012.
- Dr. Rahul K. Das, Postdoc in the Pappu Lab, Recipient of the Molecular Kinetics Postdoctoral Speaking Award and Honorarium, 5<sup>th</sup> Annual Symposium of the Intrinsically Disordered Proteins Subgroup at the 55<sup>th</sup> Annual Meeting of the Biophysical Society, Baltimore, MD, 2011.
- Mr. Albert H. Mao, MSTP and Computational & Molecular Biophysics Graduate Student in the Pappu Lab, Recipient of the SRAA Award for Best Poster, 55<sup>th</sup> Annual Meeting of the Biophysical Society, Baltimore, MD, Award Sponsored by the Intrinsically Disordered Proteins Subgroup, 2011.
- Mr. Scott L. Crick, Biomedical Engineering Graduate Student in the Pappu Lab, Selected to deliver a Platform Symposium Talk at the 54<sup>th</sup> Annual Meeting of the Biophysical Society, San Francisco, CA, 2010.
- Dr. Matthew A. Wyczalkowski, Former Biomedical Engineering Graduate Student, Recipient of the National Institutes of Health, National Research Service Award for Postdoctoral Research following the completion of thesis work in the Pappu Lab, 2010.
- Dr. Alan A. Chen, Former Computational & Molecular Biophysics Graduate Student, Recipient of the National Institutes of Health, National Research Service Award for Postdoctoral Research following the completion of thesis work in the Pappu Lab, 2010.
- Dr. Andreas Vitalis, Computational & Molecular Biophysics Graduate Student Empiris Award for Research in Brain Diseases, Award received for Ph.D. thesis work performed in the Pappu Lab, 2010.

***Other Invited talks: Fall 2001 – present (reverse chronological order)***

1. Princeton University, Department of Chemical & Biochemical Engineering, May 2018
2. University of California, Berkeley, Molecular and Cell Biology, April 2017
3. Hospital for Sick Kids, Toronto, Molecular Medicine Seminar Series, March 2017
4. Washington University, Department of Genetics Seminar Series, February 2017
5. McGill University, Department of Biology, January 2017
6. Princeton University, Department of Chemical & Biochemical Engineering, December 2016
7. Tata Institute for Fundamental Research, Mumbai, India, November 2016
8. Department of Biomedical Engineering, Washington University in St. Louis, October 2016
9. MRC Laboratory of Molecular Biology, Cambridge, UK, June 2016
10. Johns Hopkins University, Department of Materials Science, April 2016
11. Hiroshima University, December 2015
12. Duke University, NSF-MRSEC, April 2015
13. University of British Columbia, Center for High-Throughput Biology, April 2015
14. Washington University in St. Louis, Biophysical Evening, January 2015
15. University of Texas Southwestern Medical Center, Department of Biophysics, December 2014
16. University of Cambridge, Department of Chemistry, November 2014
17. MRC Laboratory of Molecular Biology, Cambridge, UK, November 2014
18. Stony Brook University, Laufer Center for Quantitative Biology, November 2014
19. Kansas State University, Department of Biochemistry, April 2014

20. Ohio State University, Department of Biochemistry, Biophysics Program, April 2014
21. University of Montana, Department of Chemistry & Biochemistry, February 2014
22. Johns Hopkins University, Department of Biophysics, December 2013
23. University of Wisconsin-Madison, Department of Chemical & Biochemical Engineering, December 2013
24. University of Zurich, Department of Biochemistry, September 2013
25. The Scripps Research Institute, Department of Molecular & Experimental Medicine, July 2013
26. University of Texas Southwestern Medical Center, University Colloquium, July 2013
27. University of Texas Southwestern Medical Center, Green Center for Systems Biology, Special Seminar, July 2013
28. Symposium on Physics and Biology of Strongly Fluctuating Proteins, University of Maryland, May 2013
29. American Chemical Society Meeting, New Orleans, April 2013
30. University of Chicago, Institute for Biophysical Dynamics, April 2013
31. March Meeting of the American Physical Society, Baltimore, March 2013
32. CUNY City College of New York, Structural Biology Colloquium, March 2013
33. 57<sup>th</sup> Annual Meeting of the Biophysical Society, Philadelphia, Protein Electrostatics Symposium
34. University of Minnesota, Department of Biomedical Engineering, December 2012
35. Protein Folding Consortium, Pls meeting, Chicago, November 2012
36. International Symposium on Protein Folding, National Centre for Biological Sciences, Bangalore, India, October 2012
37. Protein Folding Consortium, SUNY Stony Brook, NY, June 2012
38. Biopolymers Gordon Research Conference, Newport, RI, June 2012
39. Hope Center for Neurological Disorders, Washington University, May 2012
40. Arizona State University, Center for Biological Physics, Tempe, AZ, April 2012
41. University of South Florida, Department of Physics, Tampa, FL, March 2012
42. St. Jude Children's Research Hospital, Memphis, TN, January 2012
43. CCP 2011 – Conference on Computational Physics, Knoxville, TN, November 2011
44. National Science Foundation Workshop on Future of RNA and Protein Folding, Arlington, VA, September 2011
45. University of Leeds, UK, July 2011
46. MRC Laboratory of Molecular Biology, Cambridge, UK, July 2011
47. Annual Meeting of the Protein Folding Consortium, UC Berkeley, June 2011
48. University of Texas Southwestern Medical School, May 2011
49. The Scripps Research Institute, Molecular & Experimental Medicine, May 2011
50. Washington University School of Medicine, Computational & Molecular Biophysics Program, Biophysical Evening Series, May 2011
51. Midwest Conference on Protein Folding, Assembly, and Molecular Motions, May 2011
52. 55<sup>th</sup> Annual Meeting of the Biophysical Society, Baltimore, MD, March 2011
53. Department of Biochemistry, Cornell Weill Medical College, December 2010
54. ACS Midwest Regional Meeting Symposium on Protein Folding, October, 2010
55. Intrinsically disordered proteins, Keynote Session Chair, Gordon Research Conference, North Carolina, July 2010.

56. Protein folding pathways workshop, Arizona State University, May 2010.
57. University of Pittsburgh School of Medicine, March 2010.
58. Yale University, Biophysics program, January 2010.
59. Protein folding and dynamics, Gordon Research Conference, January 2010.
60. The Scripps Research Institute, Molecular & Experimental Medicine, November 2009.
61. 23<sup>rd</sup> Annual Gibbs conference on Biothermodynamics, Carbondale, IL, October 2009.
62. Tata Institute of Fundamental Research, Mumbai, India, August 2009.
63. Argonne National Laboratory, Biology Division, August 2009.
64. Northwestern University, Biochemistry, Molecular Biology & Cell Biology, July 2009.
65. Telluride Scientific Research Conference, Workshop on RNA dynamics, July 2009.
66. FASEB Amyloid meeting, Snowmass, CO, June-July 2009.
67. University of California Berkeley, Department of Bioengineering, April 2009.
68. MIT-Whitehead Institute, Department of Biology, March 2009.
69. Annual Meeting of the Biophysical Society, Invited Workshop, Boston, MA, March 2009.
70. Department of Chemistry & Biochemistry, University of Massachusetts, Amherst, MA, February 2009
71. Rice University, Department of Chemistry, November 2009.
72. Rensselaer Polytechnic Institute, Biocomputation seminar series, October 2008.
73. 22<sup>nd</sup> Annual Symposium of the Protein Society, July 2008, San Diego, CA
74. Protein Electrostatics Workshop, Telluride, CO, July 2008
75. Biopolymers Gordon Research Conference, Newport, RI, June 2008.
76. University of Texas Austin, Department of Biomedical Engineering, April 2008.
77. University of Oregon, Department of Chemistry, April 2008.
78. Intrinsically Disordered Proteins subgroup meeting, Annual meeting of the Biophysical Society, Long Beach, CA, February 2008
79. The Scripps Research Institute, Department of Chemistry, La Jolla, CA, September 2007.
80. Gordon Research Conference: Proteins, June 2007, Holderness, New Hampshire.
81. Washington University in St. Louis, Biophysical Evening Series, December 2007.
82. University of California in Santa Barbara, Department of Chemistry, April 2007.
83. University of Delaware, Department of Chemistry and Biochemistry, April 2007.
84. Indiana University, Computational Biology and Bioinformatics, September 2006.
85. National Cancer Institute, Frederick, August 2006.
86. FASEB Amyloid Meeting, Snowmass, Colorado, June 2006.
87. DIMACS Workshop on Computational / Experimental Approaches to Protein Defects in Human Disease, Rutgers University, April 2006.
88. University of North Carolina, Chapel Hill, Department of Chemistry, April 2006.
89. Duke University, Department of Biochemistry, April 2006.
90. UTMB, Galveston, TX, Sealy Center for Structural Biology, April 2006.
91. Johns Hopkins University, Department of Chemistry, March 2006.
92. Stanford University, Department of Chemistry, March 2006.
93. I2CAM Exploratory Workshop on Protein Aggregation and Amyloid Formation in Systemic and Neurodegenerative Diseases: Physical, Molecular, and Biological Approaches, EPFL, Lausanne, Switzerland, July 2005.
94. 18<sup>th</sup> Annual Gibbs Conference on Biothermodynamics, Carbondale IL, October 2004.

95. University of Iowa, Department of Chemistry, Iowa City, May 2004.
96. Washington University, Alzheimer's disease Research Center, April 2004.
97. Washington University, Department of Genetics, October 2002.
98. Washington University, Alzheimer's disease Research Center, December 2002.
99. Washington University, Biophysical Evening Seminar Series, December 2001.

### TEACHING

1. *Physics of Biopolymers*, BME 432 / 532, Fall 2019 onward. Audience: Seniors majoring in Biomedical Engineering, Chemical Engineering, and Mechanical Engineering and PhD students from different disciplines including BME, Biophysics, and Materials Science.
2. *Bioengineering Thermodynamics in Practice*, Laboratory Course, BME 329, Fall 2014 & 2015. Audience: Biomedical Engineering juniors.
3. *Bioengineering Thermodynamics*, BME 320B, Fall 2010 onward. Audience: Biomedical Engineering juniors.
4. *Bioengineering Thermodynamics Recitation*, BME 320A, Fall 2015 onward. Problem solving session. Audience: Biomedical Engineering juniors.
5. *Applied Mathematics for Biomedical Sciences*, Fall 2013. Audience: Graduate students in Biomedical Engineering & quantitative programs in the Division of Biology & Biomedical Sciences.
6. *Chemical Thermodynamics*, ChemE 320 / BME 320, Fall 2008 and 2009. Audience: Chemical Engineering sophomores and Biomedical Engineering juniors.
7. *Biomedical Engineering Design*, BME 401, Fall 2007. Co-course master for the capstone senior design course. Audience: Biomedical Engineering seniors, and graduate students in BME and Molecular Biophysics.
8. *Principles of Protein Structure*, BME 461, Every Fall starting Fall 2003. Audience: Seniors and graduate students in Biomedical Engineering.
9. *Introduction to Biomolecular Statistical Thermodynamics*, BME 531, Graduate Level, Every Spring, starting Spring 2002. Audience: Graduate students in Biomedical Engineering, Chemical Engineering, and Molecular Biophysics. Last time course was taught: Spring 2007.
10. *Modeling Biomolecular Systems, Part II*, BME 540, Fall 2004. Audience: Graduate students in Biomedical Engineering, Chemical Engineering, Molecular Biophysics, and Computational Biology.
11. *Quantitative physiology, part II*, BME 301B, **Four Lectures** on *Applications of control theory in modeling physiological systems*, Spring 2003 – Spring 2005. Audience: Juniors majoring in Biomedical Engineering.
12. *Quantitative physiology, part II*, BME 301B, **Two Lectures** on the *Quantitative aspects of Antigen-Antibody Interactions and their role in control and regulation of immune response*, Spring 2006. Audience: Juniors majoring in Biomedical Engineering.

### LEADERSHIP EXPERIENCE

#### ***Leadership Within Washington University***

I am the founding and current Director of the Center for Science & Engineering of Living Systems (CSELS).

I co-chaired the strategic planning committee commissioned by the Dean of the School of Engineering & Applied Sciences. The goal was to craft a strategic plan for the next 5-10 year period for the school.

I was the founding Director of the Center for Biological Systems Engineering (CBSE). This center incorporated researchers from the School of Engineering & Applied Science (SEAS) and the School of Medicine.

I led a cluster search to recruit suitable investigators to populate the CBSE. The search was successful in recruiting three new investigators, two by way of primary appointments in Biomedical Engineering (BME), and one with primary appointment in Pathology & Immunology (P&I). Additionally, I recruited four kindred scientists from BME and P&I with expertise in multiscale approaches to challenging problems in biomedical science.

### **Center for High Performance Computing**

I served as co-director of the Center for High Performance Computing (CHPC) at Washington University. My close involvement with the CHPC contributed to a fundamental improvement of the computational environment at Washington University.

### **Department of Biomedical Engineering**

I have contributed mainly as a citizen to the curricular and research programs within the BME department. In addition to participating on key departmental committees, I took the lead on two specific curricular matters. I took over the teaching of Thermodynamics for our BME undergraduates and redesigned this course to emphasize the importance of thermodynamics concepts across the molecular, cellular, and physiological scales. This initiative helped improve the synergy between thermodynamics and the two quantitative physiology courses that are taught in the department. I added a focused problem-solving module to this course. I proposed and designed a new laboratory module to go along with this course, and this has come to fruition.

I developed a new applied mathematics course for biomedical sciences. This course was designed to provide a direct conduit from concept to application of mathematics in biology and biomedical sciences.

From a research standpoint, I have been actively involved in faculty recruitment within BME, have chaired and been a member of search committees, and I was the primary author of the white paper that was crafted roughly a few years ago for the future research mission of the BME department.

### **SERVICE**

Member of the university-wide strategic planning committee that reports directly to the Provost; committee set up in January 2021; commission ends May, 2022.

Co-chaired the strategic planning initiative for the McKelvey School of Engineering, Fall 2016, Spring 2017.

Member, committee on academic integrity, School of Engineering & Applied Sciences, Fall 2007 – spring 2012.

## **SERVICE OUTSIDE WASHINGTON UNIVERSITY IN ST. LOUIS**

Co-organizer, Condensate Colloquium Series, bi-weekly, virtual series focused on biomolecular condensates, July 2021 – present.

Member, Scientific Advisory Board, UK Biomolecular Condensates: Collaboration for Education, Research and Translation (BioConCERT )

Member, Scientific Advisory Board at the Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany, term ending December 31, 2020

Reviewer of grants for Swiss National Science Foundation, ERC grants, BBSRC, Dutch Science Foundation, Polish Science Foundation, NIH, NSF, and DoE.

Regular reviewer of manuscripts for: *Biochemical Journal*, *Biochemistry*, *Biomacromolecules*, *Biophysical Journal*, *Biophysical Chemistry*, *Cell*, *Cell Reports*, *eLife*, *Journal of Chemical Physics*, *Journal of Molecular Biology*, *Journal of Physical Chemistry B*, *Journal of the American Chemical Society*, *Journal of Chemical Theory and Computation*, *Macromolecules*, *Molecular Cell*, *Nature*, *Nature Chemistry*, *Nature Communications*, *Proceedings of the National Academy of Sciences USA*, *PLoS: Computational Biology*, *Science*, *Science Advances*.

Panelist for review of National Science Foundation SBIR grants, Bioinformatics.

Co-author and contributor to Statement of Significance Petition to form a new Intrinsically Disordered Protein subgroup within the Biophysical Society.

Primary organizer of 1<sup>st</sup> International ICAM workshop on Multiscale Interactions and Dynamics in Complex Biological Systems, Washington University in Saint Louis, May 27-29, 2006.