

SUMMARY ABOUT DR. ANTHONY K. L. LEUNG

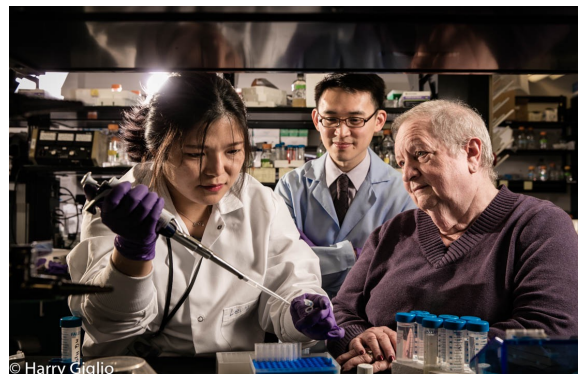
Dr. Anthony Leung is an expert in the area of gene regulation—specifically RNA, ADP-ribosylation and proteomics. Dr. Leung completed his four-year undergraduate degree and graduated with a Master's in Biochemistry at the University of Oxford. Funded by the Croucher Scholarship from Hong Kong and the Overseas Research Scheme Award from the United Kingdom, Dr. Leung earned his Ph.D. in Biochemistry from the University of Dundee under the mentorship of Dr. Angus I. Lamond. Using quantitative proteomics and imaging approaches, Dr. Leung characterized the nucleolar proteome dynamics and discovered a novel nucleolar localization pathway during his Ph.D. In 2004, Dr. Leung was awarded a Human Frontier Science Program Long-term Fellowship and, subsequently in 2007, a Special Fellowship from The Leukemia & Lymphoma Society to perform postdoctoral research on microRNAs under the mentorship of Nobel Laureate Dr. Phillip A. Sharp at MIT. In 2010, Dr. Leung obtained a joint postdoctoral appointment with Dr. Paul Chang at MIT to investigate a therapeutically important protein modification called ADP-ribosylation or poly(ADP-ribose) (PAR). Dysregulation of PAR metabolism results in neurodegenerative disorders, virus infection and cancer susceptibility.

In 2011, Anthony started his lab and has risen from the rank to a tenured Professor at Johns Hopkins. Recognizing the unmet need for research tools since its discovery in 1963, Dr. Leung started his lab by developing novel PAR tools through collaboration with experts across disciplines, from proteomics to informatics to virology. This interdisciplinary strategy led to several technological firsts: informatics portal on ADP-ribosylation, technology for ADP-ribose labeling, proteomics tools for identifying PARylated substrates and PAR binders, as well as single-molecule tools to study PAR dynamics. These tools have not only advanced his research but also enabled new avenues of investigation in academia, government, and industry.

Leveraging these innovative tools, Dr. Leung has made discoveries about PAR's role in biological processes, notably its potency in inducing protein condensation and its role in stress granule remodeling during viral infections. Through this journey, Dr. Leung grew from an RNA biologist into a recognized leader in the PAR field. He has been invited to deliver over 120 seminars, chaired scientific sessions at conferences, and successfully secured funding from the National Institutes of Health (NIGMS, NIA, NIAID), Department of Defense, American Cancer Society, and various private foundations. This journey in tool invention and biological discovery has culminated in over 80 publications, multiple patents, and a series of awards that highlight forward-thinking, including Department of Defense Idea Award, Top 10 Finalist for the American Society of Cell Biology–Gibco Emerging Leader Prize, and Shikani/EI-Hibri Prize.

Beyond his research, Dr. Leung is committed to service and leadership. He has held positions of Director of Postdoctoral Training at his department and Associate Director of Chemistry–Biology Interface at Johns Hopkins, where he also mentored a diverse group of 61 young scientists in his lab as well as 8 junior faculty. His active involvement in promoting diversity and inclusion is demonstrated by his lab's diverse makeup, participation in various committees, and leadership in kick-starting initiatives like the Larry Grossman Scholarship program, providing underprivileged high school students from Baltimore with hands-on laboratory experience. In addition, Dr. Leung goes beyond bench by actively engaging the public with science.

Read more about our work on public outreach:
<http://magazine.jhsph.edu/2017/spring/features/the-patient-researcher/>



CURRICULUM VITAE
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PERSONAL DATA

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EDUCATION AND TRAINING

Sep 1995–May 1999 M. Biochem (4-year Undergraduate Master's degree), University of Oxford, UK
Sep 1999–Mar 2003 Ph.D. in Biochemistry, University of Dundee, UK
Advisor: Professor Angus I. Lamond
Thesis: Proteomics and Dynamics of the Human Nucleolus
Summers 2002/2003 Visiting Scientist, European Molecular Biology Laboratory, Heidelberg, Germany
Apr 2004–Jun 2009 Postdoctoral Fellow, Laboratory of Phillip A. Sharp, Massachusetts Institute of Technology, USA
Jul 2009–Jun 2010 Senior Postdoctoral Fellow, Laboratory of Phillip A. Sharp, Massachusetts Institute of Technology, USA with a secondary appointment at the laboratory of Paul Chang, MIT since Jan 2010
Jul 2010–Jan 2011 Research Scientist, Laboratory of Phillip A. Sharp, Massachusetts Institute of Technology, USA
July 2018 Management Development Certificate, Johns Hopkins Carey Business School
June 2020 Business Communication Certificate, Johns Hopkins Carey Business School

PROFESSIONAL EXPERIENCE

2022– Professor, Department of Biochemistry and Molecular Biology (BMB), Bloomberg School of Public Health (JHSPH), Johns Hopkins University
2017–2022 Associate Professor, Department of Biochemistry and Molecular Biology, Bloomberg School of Public Health, Johns Hopkins University
2011–2017 Assistant Professor, Department of Biochemistry and Molecular Biology Bloomberg School of Public Health, Johns Hopkins University

Other Appointments

2018– Joint appointment in the Department of Molecular Biology and Genetics, Johns Hopkins School of Medicine (JHSOM)
2015– Joint appointment in the Department of Oncology, JHSOM
2015– Member, Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins

2011– Joint appointment, McKusick-Nathans Department of Genetic Medicine (DGM, formerly, Institute of Genetic Medicine), JHSOM

HONORS AND AWARDS

Honors

2024 15th Lundberg-Kienlen Lecturer, Oklahoma State University

2021 Finalist, President's Frontier Award, Johns Hopkins University

2020 Finalist, NIH Pioneer Award

2020 Finalist, SCIBAR Award (Support for Creative Integrated Basic and Applied Research Award), Johns Hopkins Bloomberg School of Public Health

2020 Keynote Speaker, Noncoding RNA and Therapeutics Discovery Interest Group meeting 2020, RNA society (online symposium)

2019 Semifinalist, President's Frontier Award, Johns Hopkins University

2017 Finalist, Burroughs Wellcome Fund Investigators in the Pathogenesis of Infectious Disease

2016 Top 10 Finalist, American Society of Cell Biology (ASCB)–Gibco Emerging Leader Prize

2013 Top 5 Finalist, Agilent Early Career Professor Award

2013 Keynote Speaker, Genomics 2013, Boston, Massachusetts

Awards

2022 Teaching Excellence Award, Johns Hopkins Bloomberg School of Public Health

2020 Johns Hopkins Discovery Award

2020 Teaching Excellence Award, Johns Hopkins Bloomberg School of Public Health

2019 Shikani/EI-Hibri Prize for Discovery and Innovation, Johns Hopkins Bloomberg School of Public Health

2017 Johns Hopkins Discovery Award

2017 W. W. Smith Charitable Trust Medical Research Award

2017 Teaching Excellence Award, Johns Hopkins Bloomberg School of Public Health

2016 American Cancer Society Research Scholar Award

2015 Inaugural Johns Hopkins Catalyst Award

2013 Faculty Innovation Award, Johns Hopkins Bloomberg School of Public Health

2011 Idea Award, Department of Defense Breast Cancer Research Program

2007–2010 Special Fellowship, The Leukemia & Lymphoma Society

2004–2007 Long-term Fellowship, Human Frontier Science Program

2002 European Advanced Light Microscopy Facility Fellowship, EMBL Heidelberg, Germany

1999–2002 Scholarship, Croucher Foundation, Hong Kong

1999–2002 Overseas Research Scheme Award, UK

1995–1999 Waugh Scholarship, University of Oxford, UK

1995–1999 Fitzgerald Prize, University of Oxford, UK

PROFESSIONAL ACTIVITIES

Leadership

- 2023 Session Chair, PARP2023, Croatia
- 2022 Session Chair, FASEB Meeting "NAD+ Metabolism and Signalling 2022", USA
- 2022 Session Chair, Cold Spring Harbor Laboratory Meeting, The PARP Family & ADP-ribosylation, USA
- 2020 Session Chair, Cold Spring Harbor Laboratory Meeting, The PARP Family & ADP-ribosylation, USA
- 2018– Founding member, FEBS Network on ADP-ribosylation and NAD⁺ metabolism
- 2017 Session Chair, PARP2017, 20th International Conference on ADP-ribosylation, Hungary
- 2017 Session Chair, FASEB Meeting "NAD+ Metabolism and Signalling 2017", USA
- 2017 Session Chair, Stress-Associated RNA Granules in Human Disease and Viral Infection (2nd International Symposium), Germany
- 2016 Co-organizer, Workshop on the Biology, Chemistry and Physics of non-membranous granules at Johns Hopkins (with Drs. Taekjip Ha and Takanari Inoue), USA
- 2015 Session Chair, FASEB Meeting "NAD+ Metabolism and Signalling 2015", Germany

Consultations

- 2019–2021 *Ad hoc* Consultant, FAZE Medicines (formerly Small Molecular RNA Co., Inc.)
- 2017–2020 *Ad hoc* Consultant, Ribon Therapeutics

Other Significant Activities

- 2022 Nominator, VinFuture Prize
- 2021 Science Fair Judge, Henderson–Hopkins Middle School
- 2016– Poster judge for conferences: 9th Frontiers in Chemistry and Biology Interface Symposium, Baltimore, MD (2016), Annual Retreat for Johns Hopkins Chemistry–Biology Interface Graduate Program (2016, 2018, 2019), PARP2017 meeting (2017), FASEB NAD+ metabolism and Signalling meeting (2017), Johns Hopkins Postdoctoral Association Annual Conference (2018, 2022), PARP2023 meeting (2023)
- 2016 Panel discussant, Nutritional Genomics and Public Health Lectures, Johns Hopkins School of Public Health
- 2014– Promote career development for Junior Scientists: Postdoc Workshop for Johns Hopkins Medicine Professional Development and Career Office (2014, 2018, 2019, 2020), BMB Ph.D. figure-making workshop (2020), Meet the Speaker Panelist for CSHL meeting on PARPs and ADP-ribosylation (2020)
- 2014– Breast Cancer Survivor Outreach
<http://magazine.jhsph.edu/2017/spring/features/the-patient-researcher/>
- 2012, 2016 Speaker, the University of Maryland Baltimore County–Meyerhoff Bridge Day to promote science amongst undergraduate minority students

EDITORIAL ACTIVITIES

Grant Review

- 2023 *Ad hoc* Reviewer, Cell Structure and Function 1 Study Section, National Institutes of Health, USA

- 2022 *Ad hoc Reviewer*, Extracellular RNA Sequencing Research Resource for the Accelerating Medicines Partnership® Parkinson's Disease (AMP®PD), National Institute of Neurological Disorders and Stroke, National Institutes of Health, USA
- 2021 *Ad hoc Reviewer*, Nuclear and Cytoplasmic Structure/Function and Dynamics Study Section, National Institutes of Health, USA
- 2020–2024 Member, Peer Review Committee for RNA Mechanisms in Cancers American Cancer Society, USA
- 2020, 2022 *Ad hoc Reviewer*, National Science Foundation, USA
- 2005–2023 *Ad hoc Reviewer* for non-US-based funding organizations
Chinese University of Hong Kong (2005), Royal Society, UK (2006), Human Frontier Science Program (2014), Netherlands Organisation for Scientific Research (NWO) (2015, 2016), Biotechnology and Biological Sciences Research Council (BBSRC), UK (2015), National Science Center (Narodowe Centrum Nauki), Poland (2016), Israel Science Foundation, Israel (2016), Health and Medical Research Fund from The Government of the Hong Kong Special Administrative Region (HKSAR) (2016–2018, 2020–2021, 2023–2024), Canada Research Chairs (2017), Qiu Shi Outstanding Young Scholar Award, People Republic of China (2018), Agence Nationale de la recherche, France (2018), Wellcome Trust, UK (2021), Swiss National Science Foundation (SNSF) (2021, 2023).
- 2017 *Ad hoc Reviewer*, Intramural NIH/NIA Board of Scientific Counselors' meeting, USA

Manuscript Review

- 2011– *Ad hoc Reviewer*, *PLoS Pathogens*, *Trends in Genetics*, *Trends in Biochemical Sciences*, *Nucleic Acids Research*, *NAR Cancer*, *Biochemistry*, *Microbiology and Molecular Biology Reviews*, *Biological Review*, *Scientific Reports*, *PLoS Genetics*, *Bioorganic and Medicinal Chemistry Letters*, *BMC Genomics*, *Journal of Cell Science*, *Journal of Cell Biology*, *EMBO Report*, *EMBO Journal*, *Chemical Reviews*, *FEBS Journal*, *Molecular and Cellular Biology*, *Journal of Proteomics*, *Journal of Proteomics Research*, *Cancer Research*, *mBio*, *Nature Communications*, *ACS Chemical Biology*, *ACS Catalysis*, *Journal of the American Chemical Society*, *Nature Chemical Biology*, *Cell Chemical Biology*, *Nature Protocol*, *Cell Report*, *PLoS Biology*, *PNAS*, *JCI Insight*, *eLife*, *Molecular Cell*, *Cell*, *Science*
- 2011 Textbook Manuscript Reviewer on *Molecular Biology: Principles of Genome Function* (2nd edition), by Craig, Cohen-Fix, Green, Greider, Storz, and Wolberger, Oxford University Press (ISBN: 978-0-19-956206-0)

Editorial Activities

- 2021–2023 Guest Editor, Special Issue on ADP-ribosylation in Pathogens, *Pathogens*
- 2020, 2021 Guest Reviewing Editor, *eLife*
- 2014– Member, Editorial Board, *Scientific Reports*
- 2011– Member, Editorial Board, *Frontiers in Genetics*

ACADEMIC SERVICE

Department of Biochemistry and Molecular Biology

Leadership

- 2022–2024 Chair, Faculty Search Committee on Informatics
- 2022– Director, Larry Grossman Scholarship Program (high school internship program for underrepresented/underprivileged minorities)

2018– Director, Postdoctoral Training
2017– Chair, Cecile M. Pickart Memorial Lecture Organization Committee
2014–2022 Chair, Online Communications Committee. The portfolio includes the department website, Ph.D. program website (www.jhu-bmb-phd.org), social media, and e-newsletter.

Other Significant Activities

2019–2020 Member, Faculty Search Committee
2019– Member, Diversity and Inclusion Committee
2018– Member, Equipment Committee
2018 *Ad hoc* Member, Ph.D. Admission Committee
2016 *Ad hoc* Member, Ph.D. Recruitment Committee
2016– Member, Curriculum Committee
2015– *Ad hoc* Member, Selection Committee: Sharon Krag Award (2015, 2017, 2018), John Scocca Award (2017, 2022), Larry Grossman Award (2017), Roger McMacken Award (2022).
2015–2016 Member, Curriculum Revision Committee

Johns Hopkins Bloomberg School of Public Health

2023– Member, Data Council
2020– Postdoctoral Fellow Mediator
2019– Member, Bloomberg School of Public Health Postdoc Leadership Advisory Board
2018–2020 Member, Tech Transfer Committee
2017–2019 Member, Faculty Search Committee, Bloomberg American Health Initiative (BAHI) Investigator on Obesity and Food Systems
2016–2018 Elected Faculty Senator
subcommittee member in the Discretionary Fund workgroup (2017–18)
2016 Member, Focus group in reforming Ph.D. education

Johns Hopkins University

2023– Online Communication Lead, The Epigenome Sciences Cluster
2022– Associate Director, Chemistry-Biology Interface Graduate Program
2021– University Representative, The Frontiers in Chemistry and Biology Interface Symposium Organization Committee (Serving as Chair in 2025 to host the symposium at JHU)
2019, 2021 Member, Faculty Search Committee, Department of Radiation Oncology (Division of Molecular Radiation Sciences), Johns Hopkins School of Medicine
2019– Member, Nomination Selection Committee of Margaret Q. Landenberger Research Foundation Grants (2019), Pew Scholar Awards (2020), W. W. Smith Charitable Foundation Research Grants (2021, 2022)
2017– Member, Curriculum Committee, Chemistry–Biology Interface Graduate Program
2016– Grant Reviewer, Provost’s Undergraduate Research Award (2016, 2018), Hopkins–Allegheny Health Network Cancer Research Fund (2017–2020), Catalyst Award (2018–2019), Discovery Award (2019–2020, 2022–2023), Nexus Award (2023)
2015 Member, Core-In-A-Box Workgroup – a task force to reform the core facilities across the University

PUBLICATIONS

* indicates corresponding authorship; # indicates co-first authorship; underlined indicates other Leung Lab members. Publications cited at least 10 times are denoted below.

Detailed citation information can be found (Citation: 10196; h-index=44):

https://scholar.google.com/citations?user=h_vjSXoAAAAJ&hl=en

Journal articles

1. [Badiee M](#), [Kenet AL](#), Ganser LR, Paul T, Myong S*, **Leung AKL*** (2023). Switch-like compaction of poly(ADP-ribose) upon cation binding. *Proc Natl Acad Sci U S A*. May 9;120(19):e2215068120. doi: 10.1073/pnas.2215068120. Epub May 1.
2. Lee JH, Hussain M, Kim EW, [Cheng SJ](#), **Leung AKL**, Fakouri NB, Croteau DL, Bohr VA (2023). Mitochondrial PARP1 regulates NAD⁺-dependent poly ADP-ribosylation of mitochondrial nucleoids. *Exp Mol Med*.54(12):2135-2147. (cited 11 times)
3. Kuttiyatveetil JRA, Soufari H, [Dasovich M](#), [Uribe IR](#), Mirhasan M, [Cheng SJ](#), **Leung AKL**, Pascal JM (2022). Crystal structures and functional analysis of the ZnF5-WWE1-WWE2 region of PARP13/ZAP define a distinctive mode of engaging poly(ADP-ribose). *Cell Rep*. 2022 41(4):111529. (cited 10 times)
4. Gao J, Mewborne QT, Girdhar A, Sheth U, Coyne AN, Punathil R, Kang BG, [Dasovich M](#), Veire A, DeJesus Hernandez M, [Liu S](#), Shi Z, Dafinca R, Fouquerel E, Talbot K, Kam TI, Zhang YJ, Dickson D, Petrucelli L, van Blitterswijk M, Guo L, Dawson TM, Dawson VL, **Leung AKL**, Lloyd TE, Gendron TF, Rothstein JD, Zhang K (2022). Poly(ADP-ribose) promotes toxicity of C9ORF72 arginine-rich dipeptide repeat proteins. *Sci Transl Med*. Sep 14;14(662):eabq3215. (cited 11 times)
5. LeRoux M, Srikant S, Teodoro GIC, Zhang T, Littlehale ML, Doron S, [Badiee M](#), **Leung AKL**, Sorek R, Laub MT (2022). The DarTG toxin-antitoxin system provides phage defence by ADP-ribosylating viral DNA. *Nat Microbiol*. 7:1028-1040 (cited 69 times)
6. Roy A, Alhammad YM, McDonald P, Johnson DK, [Zhuo J](#), Wazir S, Ferraris D, Lehtiö L, **Leung AKL**, Fehr AR (2022). Discovery of compounds that inhibit SARS-CoV-2 Mac1-ADP-ribose binding by high-throughput screening. *Antiviral Res*. 203:105344. (cited 20 times)
7. Sherrill LM, Joya EE, Walker A, Roy A, Alhammad YM, Atobatele M, Wazir S, Abbas G, Keane P, [Zhuo J](#), **Leung AKL**, Johnson DK, Lehtiö L, Fehr AR, Ferraris D (2022). Design, synthesis and evaluation of inhibitors of the SARS-CoV-2 nsp3 macrodomain. *Bioorg Med Chem*. 67:116788 (cited 13 times)
8. Rhine K[#], [Dasovich M[#]](#), Yoniles J[#], [Badiee M](#), Skanchy S, Ganser LR, Ge Y, Fare C, Shorter J, **Leung AKL***, Myong S* (2022). Poly(ADP-ribose) Drives Condensation of FUS via a Transient Interaction. *Mol Cell* Feb 12;S1097-2765(22)00061-2. doi: 10.1016/j.molcel.2022.01.018. (cited 40 times)
9. Chen Q, Ma K, Liu X, Chen SH, Li P, Yu Y, **Leung AKL**, Yu X (2022). Truncated PARP1 mediates ADP-ribosylation of RNA polymerase III for apoptosis. *Cell Discov*. 8(1):3. doi: 10.1038/s41421-021-00355-1. (cited 20 times)
10. [Dasovich M[#]](#), [Zhuo J[#]](#), [Goodman JA[#]](#), Thomas A[#], [McPherson RL](#), [Jayabalan AK](#), [Busa VF](#), [Cheng SJ](#), Murphy BA, Redinger KR, Alhammad YMO, Fehr AR, Tsukamoto T, Slusher BS, Bosch J*, Wei H*, **Leung AKL*** (2021). High-Throughput Activity Assay for Screening Inhibitors of the SARS-CoV-2 Mac1 Macrodomain. *ACS Chem Biol*. 17(1):17-23. (cited 31 times)
11. [Busa VF](#), Favorov AV, Fertig E*, **Leung AKL*** (2021) Spatial Correlation Statistics Enable Transcriptome-Wide Characterization of RNA Structure Binding. *Cell Reports Methods* 1, 10088
12. [Dasovich M](#), Beckett MQ, Bailey S, Ong SE, Greenberg MM*, **Leung AKL*** (2021). Identifying Poly(ADP-ribose)-Binding Proteins with Photoaffinity-Based Proteomics. *J Am Chem Soc*. 143(8):3037-3042. (cited 47 times)
13. [Jayabalan AK](#), Adivarahan S, Koppula A, Abraham R, Batish M, Zenklusen D, Griffin DE, **Leung AKL***. (2021). Stress granule formation, disassembly, and composition are regulated by alphavirus ADP-ribosylhydrolase activity. *Proc. Natl Acad Sci USA* 118: e2021719118 (cited 46 times)
14. Hammond RG, Schormann N, [McPherson RL](#), **Leung AKL**, Deivanayagam CCS, Johnson MA (2021). ADP-Ribose and Analogues bound to the DeMAYylating Macrodomain from the Bat Coronavirus HKU4. *Proc. Natl Acad Sci USA* 118: e2004500118.
15. [Ayyappan V](#), [Wat R](#), [Barber C](#), [Vivelo CA](#), [Gauch K](#), [Visanpattansasin V](#), [Cook G](#), [Sazeides C](#), **Leung AKL*** (2021). ADPriboDB 2.0: An Updated Database of ADP-ribosylated Proteins. *Nucleic Acids Research* 49:D261-265. (cited 34 times)
16. [Fischer JW](#), [Busa VF](#), [Shao Y](#), **Leung AKL*** (2020). Structure-Mediated RNA Decay by UPF1 and G3BP1. *Mol Cell*. 2020 78:70-85.e6. (cited 161 times)

17. Abraham R, McPherson RL, Dasovich M, Badiee M, **Leung AK***, Griffin DE* (2020). Both ADP ribosyl binding and hydrolase activities of the alphavirus nsP3 macrodomain affect neurovirulence in mice. *mBio* 11(1):e03253-19. (cited 40 times)
18. McPherson RL, Ong SE*, **Leung AK*** (2020). Ion-pairing with triethylammonium acetate improves solid-phase extraction of ADP-ribosylated peptides. *J. Proteome Res* 19(2):984-990.
19. Park Y, Chui MH, Suryo Rahmanto Y, Yu ZC, Shamanna RA, Bellani MA, Gaillard S, Ayhan A, Viswanathan A, Seidman MM, Franco S, **Leung AK**, Bohr VA, Shih IM, Wang TL (2019). Loss of ARID1A in tumor cells renders selective vulnerability to combined ionizing radiation and PARP inhibitor therapy. *Clin Cancer Res.* 25(18):5584-5594. (cited 84 times)
20. Kalesh K, Lukauskas S, Borg AJ, Snijders AP, Ayyappan V, **Leung AKL**, Haskard DO, DiMaggio PA (2019). An Integrated Chemical Proteomics Approach for Quantitative Profiling of Intracellular ADP-Ribosylation. *Sci Rep.* 9(1):6655. (cited 32 times)
21. Thirawatananond P, McPherson RL, Malhi J, Nathan S, Lambrecht MJ, Brichacek M, Hergenrother PJ, **Leung AKL***, Gabelli SB* (2019). Structural analyses of NudT16-ADP-ribose complexes direct rational design of mutants with improved processing of poly(ADP-ribosyl)ated proteins. *Sci Rep.* 9(1):5940. (cited 15 times)
22. Ando Y#, Elkayam E#, McPherson RL#, Dasovich M, Cheng SJ, Voorneveld J, Filippov DV, Ong SE, Joshua-Tor L, **Leung AK*** (2019). ELTA: Enzymatic Labeling of Terminal ADP-ribose. *Mol Cell* 73:845-856.e5. (cited 55 times)
23. Abraham R, Hauer D, McPherson RL, Utt A, Kirby IT, Cohen MS, Merits A, **Leung AK**, Griffin DE. (2018). ADP-ribosyl-binding and hydrolase activities of the alphavirus nsP3 macrodomain are critical for initiation of virus replication. *Proc. Natl Acad Sci USA* 115(44):E10457-E10466. (cited 113 times)
24. Zhang T, Wu Y-C, Mullane P, Ji YJ, Liu H, He L, Arora A, Hwang H-Y, Alessi AF, Niaki AG, Periz G, Guo L, Wang H, Elkayam E, Joshua-Tor L, Myong S, Kim J, Shorter J, Ong SE, **Leung AK**, Wang J (2018). FUS regulates activity of microRNA-mediated Gene Silencing. *Mol Cell* 69(5):787-801. (cited 93 times)
25. Das S, Kohr M, Dunkerly B, Bedja D, Kent OA, **Leung AK**, Henao-Mejia J, Henao-Mejia J, Flavell RA, Steenbergen C (2017). Role of miR-181 Family in the Heart: A Tale of Two Intracellular Compartments. *J Am Heart Assoc.* 6: e004694 (cited 84 times)
26. McPherson RL#, Abraham R#, Sreekumar E#, Ong SE, Cheng SJ, Baxter V, Kistemaker HAV, Filippov DV, Griffin DE*, **Leung AK*** (2017). ADP-ribosylhydrolase activity of macrodomain is required for Chikungunya viral replication and virulence. *Proc Natl Acad Sci USA* 114(7):1666-1671. (cited 164 times)
27. Vivelo CA#, Wat R#, Agrawal C, Tee HY, **Leung AK*** (2017). ADPriboDB: The Database of ADP-ribosylated Proteins. *Nucleic Acids Research* 45(D1):D204-D209; ePub Date: Aug 2016. <http://ADPriboDB.leunglab.org/> (cited 66 times; >1,000,000 hits since inception)
28. Palazzo L#, Daniels CM#, Nettleship JE, Rahman N, McPherson RL, Ong SE, Kato K, Nureki O, **Leung AK***, Ahel I* (2016). ENPP1 processes protein ADP-ribosylation in vitro. *FEBS. J.* 283(18):3371–88. (cited 72 times)
29. Hwang T, Park CK, **Leung AK**, Gao Y, Hyde TM, Kleinman JE, Rajpurohit N, Tao R, Shin JH, Weinberger DR (2016). Dynamic regulation of RNA editing in human brain development and disease. *Nature Neuroscience* 19(8):1093–9. (cited 177 times)
30. Daniels CM, Thirawatananond P, Ong SE*, Gabelli SB*, **Leung AK*** (2015). Nudix hydrolases degrade protein-conjugated ADP-ribose. *Sci Rep.* 5:18271. (cited 77 times)
31. Daniels CM, Ong SE*, **Leung AK*** (2014). Phosphoproteomic Approach to Characterize Protein Mono- and Poly(ADP-ribosyl)ation Sites from Cells. *J Proteome Res.* 13:3510-22. (cited 133 times)
32. **Leung AK**, Vyas S, Rood JE, Bhutkar AJ, Sharp PA, Chang P (2011). Poly(ADP-ribose) Regulates microRNA activity and stress responses in the Cytoplasm. *Mol Cell* 42:489-99. (cited 470 times)
33. **Leung AK#**, Young GA#, Bhutkar AJ, Zheng GX, Sharp PA (2011). Genomewide Identification of Endogenous Argonaute Binding sites in Mouse Embryonic Stem Cells with and without Mature microRNAs. *Nature Struct. Mol. Biol.* 18:237-44. (cited 285 times)
34. Singh N, Agrawal A, **Leung AK**, Sharp PA, Bhatia S (2010). Effect of nanoparticle conjugation on gene silencing by RNA interference. *J Am Chem Soc* 132(24):8241-3. (cited 97 times)

35. Dafik L, Kalsani V, **Leung AK**, Kumar K (2009). Fluorinated lipids permit facile passage of macromolecules into living cells. *J Am Chem Soc* 131(34):12091-3. (cited 32 times)
36. **Leung AK**, Calabrese MJ, Sharp PA (2006). Quantitative analysis of Argonaute protein reveals microRNA-dependent Localisation to Stress Granules. *Proc Natl Acad Sci USA* 103:18125-30. (cited 482 times)
37. **Leung AK**, Trinkle-Mulcahy L, Lam YW, Andersen JS, Mann M, Lamond AI (2006). NOPdb: Nucleolar Proteome Database. *Nucleic Acids Res* 34 (Database issue): D218-220. (cited 134 times)
38. Andersen JS, Lam YW, **Leung AK**, Ong SE, Lyon CE, Lamond AI, Mann M (2005). Nucleolar proteome dynamics. *Nature* 433(7021):77-83. (cited 1378 times)
39. Chen D, Dundr M, Wang C, **Leung A**, Lamond A, Misteli T, Huang S (2005). Condensed mitotic chromatin is accessible to transcription factors and chromatin structural proteins. *J Cell Biol* 168(1):41-54. (cited 237 times)
40. **Leung AK**, Gerlich D, Miller G, Lyon C, Lam YW, Lleres D, Daigle N, Zomerdijk J, Ellenberg J, Lamond AI (2004). Quantitative kinetic analysis of nucleolar breakdown and reassembly during mitosis in live human cells. *J Cell Biol* 166(6):787-800. (cited 202 times)
41. **Leung AK**, Andersen JS, Mann M, Lamond AI (2003). Bioinformatic analysis of the nucleolus. *Biochem J* 376(Pt 3):553-569. (cited 178 times)
42. **Leung AK**, Lamond AI (2002). In vivo analysis of NHPX reveals a novel nucleolar localization pathway involving a transient accumulation in splicing speckles. *J Cell Biol* 157:615-29. (cited 63 times)
43. Oeffinger M, **Leung A**, Lamond A, Tollervey D (2002). Yeast Pescadillo is required for multiple activities during 60S ribosomal subunit synthesis. *RNA* 8:626-36. (cited 104 times)
44. Fox AH, Lam YW, **Leung AK**, Lyon CE, Andersen J, Mann M, Lamond AI (2002). Paraspeckles: A novel nuclear domain. *Curr Biol* 12:13-25. (cited 580 times)
45. Andersen JS, Lyon CE, Fox AH, **Leung AK**, Lam YW, Steen H, Mann M, Lamond AI (2002). Directed proteomic analysis of the human nucleolus. *Curr Biol* 12(1): 1-11. (cited 1225 times)
46. Kolatkar AR, **Leung AK**, Isecke R, Brossmer R, Drickamer K, Weis WI (1998). Mechanism of N-acetylgalactosamine binding to a C-type animal lectin carbohydrate recognition domain. *J Biol Chem* 273:19502-8. (cited 128 times)

Peer-reviewed Review Articles

47. Dasovich M, **Leung AKL*** (2023). PARPs and ADP-ribosylation: Deciphering the complexity with molecular tools. *Mol Cell*. Apr 24:S1097-2765(23)00253-8. doi: 10.1016/j.molcel.2023.04.009. Online ahead of print.
48. Jayabalan AK, Griffin DE, **Leung AKL*** (2023). Pro-Viral and Anti-Viral Roles of the RNA-Binding Protein G3BP1. *Viruses*. 15(2):449. doi: 10.3390/v15020449.
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51. Busa VF, **Leung AKL*** (2021). Thrown for a (stem) loop: how RNA structure impacts circular RNA regulation and function. *Methods* 196:56-67
52. **Leung AKL*** (2020). Poly(ADP-ribose): A Dynamic Trigger for Biomolecular Condensate Formation. *Trends Cell Biol*. 30(5):370-383. (cited 104 times)
53. Vivelo CA, Ayyappan V, **Leung AK*** (2019). Poly(ADP-Ribose)-Dependent Ubiquitination and its Clinical Implications. *Biochem Pharmacol*. 167:3-12. (cited 29 times)
54. **Leung AK***, McPherson RL, Griffin DE* (2018). Macrodomein ADP-ribosylhydrolase and the Pathogenesis of Infectious Diseases. *PLoS Pathog*. 14(3): e1006864. (cited 52 times)
55. **Leung AK*** (2017). PARPs. *Curr. Biol*. 27(23), R1256-8. (cited 42 times)

56. Fischer J, **Leung AK*** (2017). CircRNAs: A Regulator of Cellular Stress. *Critical Review in Biochemistry and Molecular Biology* 52: 220-233. (cited 141 times)
57. **Leung AK*** (2015) The Whereabouts of MicroRNA Actions: Cytoplasm and Beyond. *Trends Cell Biol.* 25:601-610. (cited 187 times)
58. Daniels CM, Ong SE, **Leung AK*** (2015). The Promise of Proteomics for the Study of ADP-Ribosylation. *Mol Cell* 58(6):911-24. (cited 209 times)
Invited review to celebrate the 50th anniversary of the discovery of ADP-ribosylation.
59. Vivelo CA, **Leung AK*** (2015). Proteomics approaches to identify mono-(ADP-ribosyl)ated and poly(ADP-ribosyl)ated proteins. *Proteomics* 15(2-3):203-17. (cited 54 times)
60. **Leung AK*** (2014). Poly(ADP-ribose): An organizer of cellular architecture. *J. Cell Biol.* 205:613-9. (cited 187 times)
61. **Leung AK***, Todorova T, Ando Y, Chang P (2012). Poly(ADP-ribose) regulates post-transcriptional gene regulation in the cytoplasm. *RNA Biol.* 9(5): 542-548. (cited 78 times)
62. **Leung AK**, Sharp PA (2010). MicroRNA Functions in Stress Responses. *Mol. Cell* 40:205-15. (cited 915 times)
63. **Leung AK**, Sharp PA (2007). microRNAs: A safeguard against Turmoil? *Cell* 130:581-5. (cited 255 times)
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65. **Leung AK**, Lamond AI (2003). The Dynamics of the Nucleolus. *Crit Rev Eukaryot Gene Expr* 14:39-54. (cited 113 times)

Invited Commentaries

66. Dasovich M, **Leung AK*** (2023). Molecular Tools Unveil Distinct Waves of ADP-ribosylation During DNA Repair. *Cell Reports Methods* 3:100484. <https://doi.org/10.1016/j.crmeth.2023.100484>.
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68. **Leung AK*** (2017). SERious Surprises for ADP-ribosylation Specificity: HPF1 Switches PARP1 Specificity to Ser Residues. *Mol Cell* 65:777-778. (cited 12 times)
69. McPherson RL, **Leung AK*** (2016). ADPr-ChAP: Mapping ADP-Ribosylation onto the Genome. *Mol Cell* 61(3):327-8.
70. Ando Y, **Leung AK*** (2013). Does an emergency visit to the ER make microRNAs stronger during stress? *Mol. Cell* 52: 1-3.

Book Chapters

71. Badiiee M, Boutonnet A, Phan D, **Leung AKL*** (2023). Fluorescence-Based Analyses of Poly(ADP-Ribose) Length by Gel Electrophoresis, High-Performance Liquid Chromatography, and Capillary Electrophoresis. *Methods Mol Biol.* 2023;2609:3-21.
72. McPherson RL, Ong SE, **Leung AK*** (2018). Quantitative determination of MAR hydrolase residue specificity in vitro by tandem mass spectrometry. *Methods Mol Biol*, 1813:271-283
73. Abraham R, McPherson RL, Sreekumar E, **Leung AK***, Griffin DE* (2018). Preparation of recombinant Alphaviruses for functional studies of ADP- ribosylation. *Methods in Molecular Biology*, 1813:297-316
74. Daniels CM, Ong SE, **Leung AK*** (2017). ADP-ribosylated peptide enrichment and site identification: The phosphodiesterase-based method. *Methods in Molecular Biology* 1608:79-93 (cited 21 times)
75. Fan AC, **Leung AK*** (2016). RNA Granules and Diseases — A Case Study of Stress Granules in ALS and FTLD. *Adv Exp Med Biol* 907:263–96. (cited 63 times)
76. Ando Y, **Leung AK*** (2015). Methods for studying microRNA functions during stress. *Methods Mol Biol* 1292:115-28
77. **Leung AK***, Sharp PA (2013). Quantifying Argonaute in and out of GW/P-bodies: Implication in microRNA silencing. *Adv Exp Med Biol.* 768:165-182. (cited 59 times)
78. **Leung AK*** (2012). Overview of microRNAs in Toxicology and Human Diseases. *Continued Education Coursebook for the Teratology Society.* (2012)

79. **Leung AK*** (2012). MicroRNA Functions in Stress Responses. Continued Education Coursebook for the Society of Toxicology.
80. Rood JE, **Leung AK**, Chang P (2011). Strategies for purification of proteins associated with cellular poly(ADP-ribose) and PARP-specific poly(ADP-ribose). *Methods in Molecular Biology* 780:153-164.
81. Lam YW, Fox AH, **Leung AK**, Andersen J, Mann M, Lamond AI (2004). Nucleolar Proteomics. *The Nucleolus*. Olson, Mark O.J. (Ed) Landes Bioscience.

PATENTS

1. Methods and Uses of Enzymatic Labeling of ADP-ribose containing molecules. WO2019195240A1, published 10/10/2019
2. Compositions and methods for identifying ADP-ribosylated sites by mass spectrometry WO2016201257A3, published 02/23/2017
3. Compositions and Methods for treating cancer and modulating stress granule formation. WO2010151664A3, published 04/07/2011
4. Methods and Compositions for increasing the activity of inhibitory RNA WO2010151773A3, published 03/10/2011

PUBLIC MEDIA

Johns Hopkins University

1. Jun 2023 Johns Hopkins Medicine, Fisher Focus Summer 2023: <https://acrobat.adobe.com/link/track?uri=urn:aaid:scds:US:4c00f1bf-5069-3c12-866f-d8075c7773f7>
2. Jun 2022 Johns Hopkins School of Public Health Magazine: <https://magazine.jhsph.edu/2022/age-antivirals>
3. Dec 2021 Johns Hopkins Technology Venture, News: <https://ventures.jhu.edu/news/researchers-platform-coronavirus-antiviral-compounds/>
4. Dec 2021 Johns Hopkins University HUB: <https://hub.jhu.edu/2021/12/14/platform-screens-for-coronavirus-treatments/>
5. Dec 2021 Johns Hopkins School of Public Health News Release: <https://publichealth.jhu.edu/2021/researchers-develop-plform-to-screen-for-new-class-of-coronavirus-antiviral-compounds>
6. Jul 2020 Johns Hopkins Medicine, Fisher Focus Summer 2020: <https://hopkinsinfectiousdiseases.jhmi.edu/wp-content/uploads/2020/10/Fisher-Focus-Newsletter-Summer-2020.pdf>
7. Jul 2020 Johns Hopkins Technology Venture, Technology Spotlight: <https://ventures.jhu.edu/news/anthony-leung-technology-adp-ribose-coronavirus/>
8. Feb 2020 Johns Hopkins University HUB, <https://hub.jhu.edu/2020/02/04/cellular-rna-regulation-649-em1-art0-rel-health/>
9. Feb 2020 Johns Hopkins School of Public Health News Release: <https://www.jhsph.edu/news/news-releases/2020/a-fundamental-discovery-about-how-gene-activity-is-regulated.html>
10. Feb 2019 Johns Hopkins School of Public Health News Release: <https://www.jhsph.edu/news/news-releases/2019/a-new-toolkit-for-studying-now-parp-activity-boosts-cancers.html>
11. Dec 2017 Johns Hopkins Medicine, Fisher Focus Winter 2017: <https://hopkinsinfectiousdiseases.jhmi.edu/wp-content/uploads/2019/05/Fisher-Focus-Winter-2017.pdf>
12. Mar 2017 Johns Hopkins School of Public Health Magazine: <http://magazine.jhsph.edu/2017/spring/features/the-patient-researcher/>
13. Jan 2017 Johns Hopkins School of Public Health News Release: <https://www.jhsph.edu/news/news-releases/2017/researchers-identify-mechanism-in-chikungunya-virus-that-controls-infection-and-severity.html>
14. Dec 2016 Johns Hopkins Medicine, The Brady Urological Institute, Discovery, <https://urology.jhu.edu/newsletter/2016/Discovery2016.pdf>

15. Mar 2016 Johns Hopkins School of Public Health Magazine:
<https://magazine.jhsph.edu/2016/spring/features/generations/>

National

16. Apr 2020 Fox45 News: <https://foxbaltimore.com/news/coronavirus/local-doctors-working-on-a-cure-or-treatment-for-covid-19>
17. Apr 2020 American Cancer Society, TheoryLab Podcast: <https://podcasts.apple.com/us/podcast/how-deeper-understanding-rna-is-crucial-to-fighting/id1454395139?i=1000470609423>
18. May 2017 American Society of Cell Biology Newsletter: <https://www.ascb.org/member-news/ascb-gibco-emerging-leader-prize-essays-may-2017/>
19. Apr 2014 Department of Defense, CDMRP, Breast Cancer Research Semipostal Program Report: <https://cdmrp.army.mil/bcrp/pbks/bcrpstamp2014.pdf>

PART II

TEACHING AND MENTORING

Mentoring

Tenured Track Faculty

Vito Rebecca Assistant Professor
Member, Mentorship Committee (2022–Current)

Advisement in Laboratory Research

Non-Tenured Track Faculty

Banhi Biswas Research Associate 07/23–Current (08/22–07/23; postdoctoral fellow)

Rachy Abraham Assistant Scientist 12/22–Current

Rameez Raja Research Associate 06/22–Current

Aravinthkumar Research Associate 10/21–Current (10/16–10/21; postdoctoral fellow)
Jayabalan Awards: *Co-awardee, Fisher Center Discovery Program Pilot Grant (2018), Winner in Research Scientist/Postdoctoral Fellow Category, Research Photo Context, Johns Hopkins University (2018), Winner, GE Healthcare Cell Image Contest (2018), Best Poster Award, Annual BMB retreat (2019), Sharon Krag Award for Leadership (2020); Forbeck Scholar Award (2021)*

Postdoctoral Fellows

Mohsen Badiie 01/18–12/22, currently Staff Scientist, University of Wisconsin–Madison
Awards: *NCI T32 postdoctoral fellowship (2018–2020), Scholarship to attend the Center for the Physics of Living Cells Summer School at the University of Illinois at Urbana-Champaign (2019)*

Hyunju Ryu 06/15–07/17, currently Homemaker
Awards: *Joy Cappel Young Investigator Award from the Rockland Immunochemicals Inc. (2015), NCI T32 postdoctoral fellowship (2017)*

Naoki Hida 08/12–04/13, currently Assistant Specialist II, UC Merced.

Yoshinari Ando 09/11–08/17, currently Administrator, RIKEN Institute, Japan
Awards: *Travel Grant Award to attend 36th Annual Meeting of the Molecular Biology Society of Japan (2013), Traveling Fellowship, 20th Annual Meeting, RNA Society (2015)*

Ph.D. Students

Maranda McDonald 02/23–Current
Award: *NSF GRFP Fellowship (2022–2025); Vivien Thomas PhD Scholarship (2022–2027)*

Hongrui Liu 08/21–Current
Award: *XDBio Program Fellowship (2021–2026)*

Isabel Uribe 06/19–Current
Awards: *Journal of Cell Science Travelling Fellowship (2020), Elsa Orent Keiles Fellowship in Biochemistry (2021), Ruth L. Kirschstein National Research Service Award Individual Predoctoral Fellowship (F31), NIGMS, NIH (2021–2023)*
Honor: *Honorable Mention, NSF Graduate Research Fellowship (2020)*

- Veronica Busa 08/18–05/22 (co-mentor: Dr. Elana Fertig, Department of Oncology)
Awards: *Co-awardee, Core Coin Pilot grant from Experimental and Computational Core, Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins (2018), PhRMA Foundation (Informatics) Pre-doctoral Fellowship (2019–2021)*
- Shang-Jung Cheng 04/18–12/23, currently Postdoctoral Fellow at Johns Hopkins
Award: *Ministry of Education Scholarship, Taiwan (2019–2021), Crawford Award (2021)*
- Morgan Dasovich 08/17–11/22 (co-mentor: Dr. Marc Greenberg, Department of Chemistry), currently Postdoctoral Fellow with Dr. W. Lee Kraus at UT Southwestern.
Awards: *Elsa Orent Keiles Fellowship in Biochemistry (2020), Roger McMacken Scholarship (2020)*
- Joe Fischer 06/15–08/19, currently Senior Scientist, AstraZeneca
Thesis Title: Highly-structured 3' untranslated regions mediate RNA decay
Awards: *Poster Award, 2nd place, 2018 Genetics Research Day Poster Competition from the Maryland Genetics, Epidemiology and Medicine Training Program (2018), Ruth L. Kirschstein National Research Service Award Individual Predoctoral Fellowship (F31), NIGMS, NIH (2018–2019), Best Talk Award, Annual BMB Retreat (2018), Co-awardee, Core Coin Pilot grant from Experimental and Computational Core, Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins (2018), ORISE FDA fellowship (2019–2021)*
- Lyle McPherson 04/15–11/19, currently Postdoctoral Fellow with Dr. Laura Kiessling at MIT.
Thesis Title: Biochemical and Proteomic Investigations on the role of ADP-ribosylation in Viral Infection
Awards: *Journal of Cell Science Travelling Fellowship (2015), Elsa Orent Keiles Fellowship in Biochemistry (2017), Best Talk Award, Annual BMB Retreat (2017), Best Poster Award, PARP2017, 20th International Conference on ADP-ribosylation (2017), Co-awardee, 2017 Proteomics Core Coins, Johns Hopkins School of Medicine (2017), Best Poster Award, Annual BMB Retreat (2018), Helen Hay Whitney Fellow (2021-2024)*
- Christina Viveló 06/13–07/18, currently Communication Specialist at NCI
Thesis Title: Global analysis of ADP-ribosylated substrates and a case study of poly(ADP-ribose) dependent ubiquitination.
Award: *The Spirit of Student Assembly Award*
- Casey M. Daniels 06/11–08/15, currently Senior Scientist, AstraZeneca
Thesis Title: Characterization of the ADP-ribosylated Proteome by Mass Spectrometry
Awards: *Journal of Cell Science Travelling Fellowship (2012), Scholarship to attend Proteomics Course in Cold Spring Harbor Laboratory (2013), Elsa Orent Keiles Fellowship in Biochemistry (2014), Joy Cappel Young Investigator Award from the Rockland Immunochemicals Inc. (2014), John Scocca Achievement Award (2016)*

Masters Students

- Tannmaya MS Biotechnology, 01/24–Current
Madhvacharyula
Malika Sharma MHS, 10/23–11/23
Xingyi Yang MS Bioinformatics, 09/23–Current
Zhuo Ma MS Bioinformatics, 09/23–Current
Jackie Chang MS Bioinformatics, 09/23–Current
Raymond Cai ScM, 05/23–Current
Yuqian Wang ScM, 10/22–01/23

Ivy Zhong	ScM, 06/22–08/23
Thanh Hai Tran	MHS, 02/21–03/21
Minghui Xu	ScM, 01/21–05/22
Shuaichen Liu	MHS, 04/20–02/21
Junlin Zhou	MHS/ScM, 02/20–06/21
Chengzhang Zhu	ScM (Department of Molecular Microbiology and Immunology [MMI]), 10/19–12/19
Jack Goodman	MHS/ScM, 10/18–05/20
Ricky Wat	MPH, 09/15–06/16
Geervani Daggupati	MHS, 01/18–02/18
Wei Wang	MHS, 10/17–03/18
Prithvi Sinha	MHS, 08/17–10/17
Shang-Jung Cheng	MHS/ScM, 01/16–08/17
Haobo Wang	MHS/ScM, 09/14–08/16
Ryan Welter	ScM, 07/12–10/13
Jennifer A. Pak	ScM, 06/11–01/12

Undergraduate Students

Piyush Rath	BS Molecular & Cellular Biology 09/23–
Oriel Savir	BS Molecular & Cellular Biology & Computer Science 03/23–06/23
Jason Chen	BS Molecular & Cellular Biology 03/23–06/23
Spriha Thapa	BS Molecular & Cellular Biology 03/23–06/23
Francis Middleton-Davis	BS Molecular & Cellular Biology 02/23–05/23
Krishna Bhambhani	BS Chemical and Biomolecular Engineering, 09/22–
Abby Swamidoss	BS Biomedical Engineering, 09/22–05/23
Allison Lilley	BS Molecular & Cellular Biology, 09/22–07/23
Caroline Wang	BS Public Health and Biology, 05/20–05/22 <i>Award: Woodrow Wilson Fellowship (2020–2022)</i>
Ahmed El-Morsey	BS Molecular & Cellular Biology and Public Health, 05/20–05/21
Alekya Vejendla	BS Molecular & Cellular Biology and Public Health, 11/19–12/21
Isabelle Tseng	BA Biology, 03/19–02/20
Deepthi Sudhakar	BS Biomedical Engineering, 02/19–06/19
Megan Chien	BS Computer Science, 12/18–05/19
Calvin Barber	BS Biophysics, 12/18–08/20
Adam Kenet	BS Biomedical Engineering, 10/18–05/22
Jodie Hoh	BS Computer Science, 10/18–11/18
Vinay Ayyappan	BS Biomedical Engineering, 01/18–08/20 <i>Awards: Astronaut Scholarships (2019), Churchill Scholarship (2020)</i>
Pat Visanpattanasin	BA Biology, 09/17–06/18
Mark Vdovychenko	BS Molecular & Cellular Biology, 09/17–12/17
Garth Cook	BS Molecular & Cellular Biology, 09/17–06/19
Kathryn Gauch	BS Molecular & Cellular Biology, 09/17–12/18
Claire Shao	BS Molecular & Cellular Biology, 09/17–06/19
Emily Burnette	BS Biomedical Engineering, 09/17–02/19
Hui Yi Tee	BS Molecular & Cellular Biology, 11/14–04/16

Non-degree Students

Sophia Cai	Grade 10 student, Marriotts Ridge High School, MD, 07/23–08/23
Rishi Goel	Grade 11 student, Santa Susana High School, CA, 04/20–08/21
Matthew Pasteris	BS Candidate, Florida International University, 06/19–08/19 - supported via NIH MARC U*STAR Scholarship
Catalina Greanga	MD Candidate, Iuliu Hatieganu University of Medicine and Pharmacy, Romania, 08/18–09/18

Charul Agrawal BS Candidate, Indian Institute of Technology, Delhi, 05/15–07/15
 - supported via Khorana Scholarship program, India

Jerome Yu BS Candidate, Fudan University, China, 06/14–08/14

Alexander Fan BS Bioengineering, University of Colorado, Boulder, 05/14–08/14

Jayson Baman MD Candidate, University of Rochester, 06/14–08/14
 - supported via Offices for Medical Education Summer Research Fund, University of Rochester Medical Center

Christine Shen Grade 12 student, Marriotts Ridge High School, MD, 07/13–08/13

Student Advisement in Community

Preliminary Oral Examination

Department of Biochemistry and Molecular Biology, JHSPH

Yiran Wang	Member, Exam Committee (2023)	Advisor: Dani Cai
Jane Lee	Member, Exam Committee (2023)	Advisor: Dani Cai
Marika David	Member, Exam Committee (2022)	Advisor: Val Culotta
Charlie Lenihan	Member, Exam Committee (2021)	Advisor: Scott Bailey
Shuo Li	Member, Exam Committee (2016)	Advisor: Elizabeth Chen
Shaina L. Palmere	Member, Exam Committee (2012)	Advisor: Daniela Drummond-Barbosa

Department of Biostatistics, JHSPH

Runzhe Li	Member, Exam Committee (2020)	Advisor: Hongkai Ji
Alyssa Frazee	Member, Exam Committee (2012)	Advisor: Jeff Leek

Department of Genetic Medicine, JHSOM

Nguyet Le	Member, Exam Committee (2022)	Advisor: Seth Blackshaw
Allison Kalinousky	Member, Exam Committee (2021)	Advisor: Hans Bjornsson
Kurt Weir	Member, Exam Committee (2019)	Advisor: Seth Blackshaw
Lily Zheng	Member, Exam Committee (2018)	Advisor: Rachel Karchin
Anna Moyer	Member, Exam Committee (2017)	Advisor: Roger Reeves
Sarah Robbins	Member, Exam Committee (2016)	Advisor: Dave Valle
Hannah Edelman	Member, Exam Committee (2015)	Advisor: Andrew McCallion
Jing You	Member, Exam Committee (2014)	Advisor: Dave Valle
Jane Welch	Member, Exam Committee (2013)	Advisor: Sarah Wheelan and Kathleen Burn
Melissa Lee	Member, Exam Committee (2012)	Advisor: Garry Cutting

Biochemistry, Cellular and Molecular Biology Graduate Program, JHSOM

Joshua Garcia Colon	Member, Exam Committee (2022)	Advisor: Josh Modell
Alejandra Montano Romero	Member, Exam Committee (2021)	Advisor: Edward Twomey
Mara Grace	Member, Exam Committee (2020)	Advisor: Erika Matunis
Brittany Pielstick	Member, Exam Committee (2019)	Advisor: Winston Timp
Eduardo Martinez-Montes	Member, Exam Committee (2018)	Advisor: Andrew Feinberg

Chemistry–Biology Interface graduate program

Eli Kengmana	Member, Exam Committee (2022)	Advisor: Rebecca Schulman
Haley Tarbox	Member, Exam Committee (2021)	Advisor: Stephen Fried
Mitchell Porter	Member, Exam Committee (2020)	Advisor: Ron Schnaar
Shaun Spisak	Member, Exam Committee (2019)	Advisor: Marc Ostermeier
Lauren Bambarger	Member, Exam Committee (2019)	Advisor: Caren L. Freel Meyers
Katelyn Jackson	Member, Exam Committee (2018)	Advisor: Scott Bailey

XDBio graduate program

Ariane Mandlbauer Chair, Exam Committee (2022) Advisor: Luisa Cochella

Cell, Molecular, Developmental Biology and Biophysics graduate program

Bradleigh Navalsky Chair, Exam Committee (2020) Advisor: Sua Myong

Cellular and Molecular Medicine graduate program

Vania Wang Member, Exam Committee (2022) Advisor: Ashi Weeraratna

Department of Chemistry, Kreiger School of Arts & Sciences

Sea On Lee Chair, Exam Committee (2020) Advisor: Stephen Fried

Thesis Committee

Department of Genetic Medicine, JHSOM

Erik Cormack 2023–Current Advisor: Luisa Cochella
Will Simmons 2022–Current (Chair) Advisor: Geraldine Seydoux
Joseph Tilghman 2016–2019 Advisor: Aravinda Chakravarti
Tyler Creamer 2014–2015 Advisor: Dan Warren

Department of Biomedical Engineering, JHSOM

Taeyoung Hwang 2014–2016 Advisor: Daniel Weinberger

Department of Pathology, JHSOM

Youngran Park 2016–2017 Advisors: Tian-Li Wang and
le-Ming Shih

Chemistry–Biology Interface, JHU

Mitchell Porter 2021–2023 Advisor: Ronald Schnaar
Katelyn Jackson 2018–Current Advisor: Scott Bailey
Sabrina Schatzman 2016–2019 Advisor: Val Culotta
Ryan Porell 2017–2018 Advisor: Ron Schnaar

Biochemistry, Cellular and Molecular Biology Graduate Program

Taylor Cottle 2021–Current Advisor: Taekjip Ha

XDBio graduate program

Saki Takayanagi 2023–Current Advisor: Takanari Inoue

Cell, Molecular, Developmental Biology, and Biophysics Graduate Program

Nils Benning 2021–Current Advisor: Taekjip Ha
Nathalie Djaja 2021–Current Advisor: Sua Myong

Department of Biochemistry and Molecular Biology, JHSPH

Marika David 2022–Current (Chair) Advisor: Val Culotta
Shuyin He 2022–Current (Chair) Advisor: Michael Matunis
Wei Wang 2021–2023 Advisor: Michael Matunis
Kyler Weingartner 2021–Current Advisor: Jennifer Kavran
Leah Cairns 2017–2018 Advisor: Jennifer Kavran
Stephen Wellard 2017 Advisor: Phil Jordan
Elizabeth Alexander 2016–2018 Advisor: Jiou Wang

Department of Molecular Microbiology and Immunology, JHSPH

Lisa Pieterse 2023–Current Advisor: Diane E. Griffin

Department of Pharmacology, JHSOM

Yuting Yuan 2022–Current
Shih-Ching Chou 2018–2021

Advisor: Namandjé Bumpus
Advisor: Valina and Ted Dawson

Department of Molecular Biology and Genetics, JHSOM

Miguel Pacheco 2020–Current
Colin Gliech 2019–2023

Advisor: Rachel Green
Advisor: Andrew Holland

Department of Biophysics, Kreiger School of Arts & Sciences

Amir Ghanbari Niaki 2019–2020

Advisor: Sua Myong

Final Oral Participation

Department of Biostatistics, JHSPH

Alyssa Frazee Member, Exam Committee (2014) Advisor: Jeff Leek
Samara Kiihl Member, Exam Committee (2012) Advisor: Rafael Irizarry

Department of Biochemistry and Molecular Biology, JHSPH

Wei Wang Member, Exam Committee (2023) Advisor: Michael Matunis

Department of Environmental Health and Engineering, JHSPH

Suzanne N. Martos Member, Exam Committee (2017) Advisor: Zhibin Wang
Tyna Dao Member, Exam Committee (2015) Advisor: Winnie Tang
Suengwon Lee Member, Exam Committee (2014) Advisor: James Sham

Department of Molecular Microbiology and Immunology, JHSPH

Jason Huska Member, Exam Committee (2018) Advisor: J. Marie Hardwick

Department of Biomedical Engineering, JHSOM

Taeyoung Hwang Member, Exam Committee (2016) Advisor: Daniel Weinberger

Department of Pathology, JHSOM

Youngran Park Member, Exam Committee (2017) Advisors: Tian-Li Wang and
le-Ming Shih

Chemistry-Biology Interface

Mitchell Porter Member, Exam Committee (2023) Advisor: Ronald Schnaar
Sabrina Schatzman Member, Exam Committee (2019) Advisor: Val Culotta

Department of Biophysics, Kreiger School of Arts & Sciences

Amir Ghanbari Niaki Chair, Exam committee (2020) Advisor: Sua Myong

Other Significant Student Advisement

University of Oulu, Finland

Sudarshan Murthy Member, Exam Committee (2020) Advisor: Lari Lehtiö

Classroom Instruction

Course Directorship

2014– Co-director, Concepts of Molecular Biology (JHSPH, 120.602.01)

Class Teaching

2021 Lecturer, MPH Seminar in Public Health Topics (JHSPH, 550.607.01)
2018 Lecturer, Biophysics 250.106/300/306 (JHU)
2016–2019 Lecturer, Molecular Toxicology (JHSPH, 187.632.01)
2016– Lecturer, CBI core course I (JHU cross departmental Ph.D. program)

2014– Lecturer, Molecular Mechanism of Disease (JHSOM, ME 710.702)
2013– Lecturer, Concepts of Molecular Biology (JHSPH, 120.602.01)
2013– Lecturer, Molecular Biology of Cellular Stress and Quality Control (JHSPH, 120.606.01)
2011– Lecturer, Advanced Topics in Human Genetics (JHSOM)
2011– Lecturer, Current Topics in BMB (JHSPH, 120.872.01)
2011– Faculty Leader, Core Research Literature (JHSPH, 120.852.01)

Other Significant Teaching

6/2012 Lecturer, Continuing Education Course on “MicroRNA Functions”, Teratology Society, Annual Meeting, Baltimore, Maryland
3/2012 Lecturer, Continuing Education Course on “MicroRNA Functions in Stress Responses” in the Society of Toxicology, Annual Meeting, San Francisco, California

BMB MHS thesis advisor:

Aditi Kantipuly (2014), Hema Chagarlamudi (2015), Stephanie Owusu (2015), Deasty Imara (2016), Shae Rowlandson (2016), Alex Cole (2017), Amanda Lourenco (2017), Balaganesh Natarajan (2017), Bryanna Stukes (2017), Chase Alston (2018), Leah Goldberg (2018), Geervani Daggupati (2018), Christina Buscaglia (2019), Shuying He (2019), Nina Modanlo (2019), Penelope Parker (2019), Jenny Lin (2020), Aihui Wang (2020), Timothy Tsung (2020), Minghui Xu (2021), Kate Cho (2021), Alliyah Allick (2021), Jenny Carpenter (2022), Megan Prosser (2022), Pranavkrishna Shivashankar (2022), Raymond Cai (2023), Yuzheng Chen (2023), Sophia Korotev (2023), Yuqian Wang (2023), Yixin Zhou (2023), Jiawei Fan (2024), Yanan Shi (2024), Steve Niu (2024)

MAPHB thesis advisor:

David Feldman (2023)

ScM thesis reader: Grace Hwang (BMB, 2012), Mridula Balakrishnan (BMB, 2012), Yoo Jin Kim (BMB, 2017), Taewoo Kim (MMI, 2020), William Zhong (BMB, 2023), Siyuan Hao (BMB, 2023), Yuzhou Huang (BMB, 2023)

RESEARCH GRANT PARTICIPATION

Acquired ~\$6.4M extramural grants from DOD and various NIH institutes (NIGMS, NIA, NIAID, NHLBI, NHGRI) and \$1.2M internal funding from Johns Hopkins, as well as helped secure \$3.2M equipment grants for collaborators and \$264k for trainees.

Current

01/01/23–12/31/24
(no-cost extension) **Targeting Stress Granule Formation in Pancreatic Ductal Adenocarcinoma**
Sol Goldman Pancreatic Cancer Fund
Role: PI
Effort: 2%
The main goal of this project is to develop inhibitors and understand the mechanism of action against stress granule formation in pancreatic cancers.

04/01/22–03/31/27 **Implications of PARP1 in myelodysplastic syndromes and targeted therapy**
R01HL163011
Sponsor: NIH/NHLBI
PI: Hai Dang Nguyen (University of Minnesota)
Role: Co-I
Effort: 5%

09/22/21–06/30/24 **Dissecting ADP-ribosylation as an innate immune response countering influenza virus replication**
R21AI160779 [no-cost extension]
Sponsor: NIH/NIAID

PI: Andrew Mehle (University of Wisconsin, Madison)

Role: Co-I

Effort: 4%

The main goal of this project is to elucidate the mechanism of ADP-ribosylation mediated viral inhibition in influenza infection.

09/30/20–08/31/24

Defining the Role of Poly ADP-ribose in Biomolecular Condensation in ALS and FTL D

RF1AG073126

Sponsor: NIH/NIA

Contact PI: Sua Myong

Role: Co-PI (MPI)

Effort: 15%

The main goal of this project is to identify the role of poly(ADP-ribose) in FUS-mediated condensation important for neurodegeneration.

03/01/15–08/31/24

Role of ADP-ribosylation in stress granules

R01GM104135-06

Sponsor: NIH/NIGMS

Role: PI

Effort: 25%

The main goal of this project is to identify critical ADP-ribosylation parameters in regulating stress granule formation.

Previous Grants/Contracts

05/01/22–10/31/23

Development of Macrod domain Inhibitor

Bluefield Innovation

Role: PI

Effort: 35%

The main goal of this project is to develop macrodomain inhibitor to treat SARS-CoV-2 and other coronavirus infection.

09/01/21–08/31/22

Role of ADP-ribosylation in Stress Granules (Supplement for Equipment)

R01GM104135-07S1

Sponsor: NIH/NIGMS

Role: PI

This equipment supplement allows me to purchase a high-end fluorescence microscope.

01/01/21–12/31/22

Exploring the Biology of Structure-Mediated RNA Decay

Johns Hopkins University Discovery Award

Role: PI

Effort: 5%

The main goal of this project is to discover the rules of Structure-Mediated RNA Decay and its biology in cancer disparity.

09/01/19–08/31/21

Role of the nsP3 macrodomain in alphavirus virulence

R56AI137264-02

Sponsor: NIH/NIAID

Contact PI: Diane E. Griffin

Role: Co-PI (MPI)

Effort: 15%

The main goal of this project is to identify the host responses due to viral macrodomain ADP-ribosylhydrolase activity

07/01/16–06/30/21

Increase microRNA activities by inhibiting poly(ADP-ribose) polymerases

Research Scholar Award

Sponsor: American Cancer Society

Role: PI

Effort: 15%

The main goal of this project is to study the role of PARylation in microRNA binding protein argonaute in breast cancer.

04/01/19–09/30/21

Targeting ARID1A-mutated Cancers with PARP Inhibitor and Irradiation Therapy

Pilot grant

Sponsor: Johns Hopkins–Allegheny Health Network

Contact PI: Tian-Li Wang

Role: Co-PI

Effort: 5%

The main goal of this project is to use a novel technique to identify PARylation signatures in ARID1A mutant cell lines.

10/15/19–10/14/21

Explore PARP1 PARylation signatures as a biomarker of PARP inhibitor sensitivity

Ovarian Cancer SPORE Career Enhancement Program

Role: PI

Effort: 5%

The main goal of this project is to use PARP1 PARylation status as a biomarker of PARP inhibitor sensitivity of ovarian cancer cells.

06/18/20–12/18/20

Developing macrodomain inhibitor for the treatment of COVID19 and other coronavirus infections.

COVID-19 Preclinical Research Discovery Award

Sponsor: Johns Hopkins University

Role: PI

Effort: 2.5%

The main goal of this project is to optimize our high-throughput assay through a pilot screen.

06/01/19–09/30/19

Identifying ADP-ribosylation targets in patient cell lines

Sponsor: NIH/NHGRI

Role: PI

Effort: 1.5%

The main goal of this project is to identify ADP-ribosylated targets altered in patient cell lines

06/01/19–09/30/19

Identifying PARP target

Sponsor: Ribon Therapeutics

Role: PI

Effort: 1.5%

The main goal of this project is to identify target of a novel PARP inhibitor

- 12/01/18–11/31/19 **RNA- and CLIP-Seq Analyses to Globally Characterize a Novel Structure-based RNA Decay Pathway**
Pilot Grant from Experimental and Computational Genomics Core
Sponsor: The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins
Role: PI
The main goal of this project is to use sequencing technology to illustrate a novel structure-based RNA decay pathway.
- 04/01/18–03/31/20 **Dissecting ADP-ribosylation Signals in Tamoxifen Resistance**
The W. W. Smith Charitable Trust Medical Research Award
Sponsor: The W. W. Smith Charitable Trust
Role: PI
Effort: 10%
The main goal of this project is to identify the role of MacroD2 in tamoxifen resistance.
- 03/01/18–02/28/19 **Post-transcriptional Gene Regulation by Cytoplasmic Poly(ADP-ribose) polymerases (Supplement for Equipment)**
R01GM104135-04S1
Sponsor: NIH/NIGMS
Role: PI
This is a supplement for the purchase of a nanodrop spectrophotometer and a high-performance liquid chromatography system
- 01/01/18–12/31/19 **Understanding how virus virulence is regulated by the ADP-ribosylhydrolase activity of the macrodomain—a potential drug target**
Fisher Center Discovery Program
Sponsor: The Sherrilyn and Ken Fisher Center for Environmental Infectious Diseases, Johns Hopkins University School of Medicine
Role: PI
Effort: 5%
The main goal of this project is to investigate the role of macrodomain in human and mosquito cells.
- 11/01/17–10/31/18 **Enzymatic labeling and enrichment of the ADP-ribosylated proteome**
2017 Proteomics Core Coin Award
Sponsor: Mass Spectrometry and Proteomics Facility, Johns Hopkins School of Medicine
Role: PI
The main goal of this project is to use novel proteomics technique to identify ADP-ribosylation sites from cells
- 07/01/17–06/30/19 **Robust Identification of ADP-ribosylation Sites in Tissue Samples: Identifying Biomarkers of PARP inhibitor responders**
The Technology Development Accelerator Fund Seed Grant
Sponsor: The Johns Hopkins University Bloomberg School of Public Health
Role: PI
Effort: 5%
The main goal of this project is to develop proteomics approach to analyze ADP-ribosylation sites in tissue samples.
- 07/01/17–01/31/19 **Uncovering Poly(ADP-ribose) Biology in Non-membranous Structures**
Discovery Award

Sponsor: Johns Hopkins University
Role: co-PI (MPI)
Principal Investigators: Leung, AKL (contact PI), Myong, S and Greenberg, M.
Effort: 10%
The main goal of this project is to develop an interdisciplinary team to develop novel chemical and biophysical tools to investigate poly(ADP-ribose) biology

05/15/17–04/30/18

Research and screening platform for Alzheimer's and other chronic diseases

R43AG056208

Sponsor: NIH/NIA

Role: Consultant

Principal Investigator: Celedon, Alfredo

Effort: 2%

The main goal of this project is to develop novel tools to detect biomarkers of Alzheimer's and other chronic diseases. My role is as a consultant on microRNA technologies.

04/15/17–04/14/18

A nanoLC-orbitrap tribrid instrument for comprehensive proteomics analyses

1S10OD021502-01A1

Sponsor: NIH

Role: Co-I

Principal Investigator: Ong, Shao-En (University of Washington)

The main goal of this project is to obtain a Thermo Orbitrap Fusion Lumos and an Ultimate 3000 RSLCnano UHPLC instrument at my collaborator's lab.

04/01/16–03/31/17

Fourier transform Orbitrap Fusion Lumos tribrid mass spectrometer with ETD

S10OD021844

Sponsor: National Institute of Health

Role: Co-I

Principal Investigator: Akhilesh Pandey

The main goal of this project is to obtain a new Orbitrap Fusion Lumos tribrid mass spectrometer with ETD to Johns Hopkins

01/15/16–01/14/17

The role of nsP3 in neurovirulence of chikungunya virus

Pilot grant

Sponsor: The Sherrilyn and Ken Fisher Center for Environmental Infectious Diseases Discovery Program, Johns Hopkins University

Role: Co-I

Principal Investigator: Griffin, DE

The main goal of this project is to identify the role of nsP3 in neurovirulence of chikungunya virus.

07/01/15–12/31/16

A Novel Proteomics Approach for Characterizing Macrodomein—A Potential Antiviral Drug Target

Catalyst Award

Sponsor: Johns Hopkins University

Role: PI

Effort: 5%

The main goal of this project is to investigate the role of macrodomain in Sindbis Virus

- 07/01/15–06/30/16 **Novel Circular Supercoiling Biosensors for MicroRNA detection**
R43HG008709
Sponsor: NIH/SBIR
Role: Co-I
Principal Investigator: Celedon, Alfredo
Effort: 1.6%
The main goal of this project is to develop novel tools to identify microRNAs from cancer cells.
- 04/01/15–03/31/17 **Nucleolus: a novel paradigm for PARP1/2 functions and clinical application**
Pilot grant
Sponsor: Johns Hopkins–Allegheny Health Network Cancer Institute
Principal Investigator: Laiho, M
Role: Co-PI
Effort: 5%
The main goal of this project is to use a novel proteomics technique to identify PARylation substrates in the nucleolus.
- 04/01/15–03/31/17 **Using PARylation Signature to Identify Prostate Cancer sensitive to PARP inhibitor**
Pilot grant
Sponsor: Patrick C. Walsh Cancer Research Fund
Role: PI
Effort: 5%
The main goal of this project is to use a novel proteomics technique to identify biomarker for PARP inhibitors in prostate cancers.
- 07/01/14–06/30/15 **Novel Proteomics Approaches to Identify Breast Cancer Patients Responsive to PARP inhibitors**
Pilot grant
Sponsor: Safeway Research Foundation
Role: PI
Effort: 5%
The main goal of this project is to use a novel proteomics technique to identify biomarker for PARP inhibitors in breast cancers.
- 09/1/13–08/31/14 **Understanding the mechanism of poly(ADP-ribosyl)ation-regulated ubiquitination**
Pilot grant
Sponsor: Johns Hopkins Tech Center for Networks and Pathways derived from U54–GM103520
Role : PI
Effort: 5%
The main goal of this project is to identify the ubiquitinated proteome and quantitatively compare the proteomes in various conditions when poly(ADP-ribose) level is altered.
- 05/01/13–04/30/14 **Circulating RNAs as Trans-generational Gene Regulators and Disease Biomarkers**
Faculty Innovation Award
Sponsor: Johns Hopkins Bloomberg School of Public Health
Role: PI

Effort: 5%

The main goal of this project is to profile circulating RNAs in fetal cord blood samples

01/01/13–12/31/13

Designing inhibitors against PARP-12 – a member of a novel poly(ADP-ribose) polymerase family subclass

Translational Research Award

Sponsor: Johns Hopkins Medical Institute Brain Science Institute

Role: PI

Effort: 5%

The main goal of this project is to develop inhibitor against mono(ADP-ribose)transferase PARP-12

08/01/11–07/31/13

The Role of Poly(ADP-ribose) in microRNA activity in Breast Cancers

Idea Award BC101881

Sponsor: Department of Defense Breast Cancer Research Program

Role: PI

Effort: 20%

The main goal of this project is to identify how AGO2 PARylation is dysregulated in breast cancer cells through development of novel proteomics tools.

Trainee-related funding

09/01/21–08/31/23

Developing Mass Spectrometry-based Approaches to Characterize Mono- and Poly(ADP-ribosyl)ated Proteomes

F31GM143918

Sponsor: NIH/NIGMS

Role: Sponsor

This Ruth L. Kirschstein National Research Service Award (NRSA) Individual Predoctoral Fellowship (Diversity) supports the work of Ph.D. student Isabel Uribe.

01/01/20–12/31/21

Informatics Predoctoral Fellowship

Sponsor: PhRMA Foundation

Role: Mentor

This fellowship partially supports Ph.D. student Veronica Busa based on her academic excellence.

07/01/19–06/30/21

Government Scholarship to Study Abroad

Sponsor: Department of Education, Taiwan Government

Role: Mentor

This scholarship supports Ph.D. student Shang-Jung Cheng based on her academic excellence.

03/01/18–08/31/19

Mechanism of Circular RNA degradation

F31GM125109

Sponsor: NIH/NIGMS

Role: Sponsor

This Ruth L. Kirschstein National Research Service Award (NRSA) Individual Predoctoral Fellowship (Non-diversity) supports the work of Ph.D. student Joseph Fischer.

09/01/15–08/31/17

Post-transcriptional Gene Regulation by Cytoplasmic Poly(ADP-ribose) polymerases (Diversity Supplement)

Sponsor: NIH/NIGMS
Total Direct Cost: \$77,034
Role: PI

This supplement supports the training of Lyle McPherson, an under-represented minority graduate student.

Preceptor in the following training grants

- 2018– Biochemistry, Cellular and Molecular Biology graduate program (T32GM007445)
- 2015– Chemistry–Biology Interface graduate program (T32GM080189)
- 2011– Human Genetics graduate program (T32GM007814)
- 2011– Cancer Research graduate program (T32CA009110)

INVITED PRESENTATION

Scientific Meetings

1. Mar 2024 Baltimore Area Repair Symposium, co-organized by Johns Hopkins University, University of Maryland and National Institute of Aging, Baltimore, Maryland, USA
2. Nov 2023 2023 FEBS Advanced Course “Cellular Stress and ADP-ribosylation”
3. Jun 2023 PARP2023, Hvar, Croatia
4. Jun 2022 FASEB "The NAD + Metabolism and Signaling Conference"
5. May 2022 American Chemical Society, Chemistry at the Frontline of Coronavirus Conference
6. Apr 2022 Cold Spring Harbor Laboratory Meeting, The PARP Family & ADP-ribosylation, Cold Spring Harbor, New York, USA
7. Jul 2021 American Chemical Society Chem Bio Connections summer symposium
8. Dec 2020 Cold Spring Harbor Laboratory Meeting, The PARP Family & ADP-ribosylation, Cold Spring Harbor, New York, USA
9. Nov 2020 **Keynote Speaker**, 2020 Noncoding RNA and Therapeutics Discovery Interest Group meeting (online symposium sponsored by RNA society)
10. May 2020 25th Biophysics Conference, Biophysical Society of Republic of China, Taiwan (postponed due to COVID-19)
11. May 2019 PARP2019, Budapest, Hungary.
12. Oct 2018 3rd International Symposium in Epigenetic Mechanisms and Human Health, South University of Science and Technology, Shenzhen, China
13. May 2018 11th Annual Frontiers at the Chemistry & Biology Interface Symposium, Philadelphia, Pennsylvania, USA
14. Apr 2018 Cold Spring Harbor Laboratory Meeting, The PARP Family & ADP-ribosylation, Cold Spring Harbor, New York, USA
15. Jul 2017 FASEB Meeting “NAD+ Metabolism and Signaling 2017”, New Orleans, Louisiana, USA
16. Jun 2017 Annual Society of Virology 2017, Madison, Wisconsin, USA
17. May 2017 PARP2017, 20th International Conference on ADP-ribosylation, Budapest, Hungary.
18. Oct 2016 11th Annual Johns Hopkins Prostate Research Day, Baltimore, Maryland, USA
19. Sep 2016 Workshop on Biology, Chemistry and Physics of Non-membranous Granules, Johns Hopkins University, Baltimore, Maryland, USA
20. Apr 2016 Cold Spring Harbor Laboratory Meeting, The PARP Family & ADP-ribosylation, Cold Spring Harbor, New York, USA
21. Aug 2015 FASEB Meeting "NAD+ Metabolism and Signalling 2015", Timmedorfer Strand, Germany
22. May 2015 RNAi/MicroRNAs-Boston-2015 Meeting, Boston, Massachusetts, USA
23. May 2015 8th Annual Safeway Breast Cancer Research Retreat, Baltimore, Maryland, USA
24. Jun 2014 1st symposium on stress-associated RNA granules, Halifax, Canada.
25. April 2014 Inaugural Cold Spring Harbor Laboratory Meeting, The PARP Family & Friends: Gene Regulation and Beyond, Cold Spring Harbor, New York, USA

26. Mar 2014 Baltimore Area Repair Symposium, co-organized by Johns Hopkins University, University of Maryland and National Institute of Aging, Baltimore, Maryland, USA
27. Sep 2013 PARP2013, 50th anniversary meeting for the discovery of poly(ADP-ribose), Quebec, Canada.
28. May 2013 **Keynote Speaker**, Genomics Research 2013, Boston, Massachusetts, USA
29. Apr 2012 Genomics Research 2012, Boston, Massachusetts, USA
30. Jun 2011 **Plenary Speaker**, RNA meeting 2011, Kyoto, Japan
31. Apr 2011 5th Annual RNAi and microRNA World Congress, Boston, Massachusetts, USA
32. May 2009 The New York Academy of Sciences, “RNA in Stress Response and Longevity Control” symposium, New York City, New York, USA
33. May 2008 Society of Biological Psychiatry, 63rd Annual Meeting, “MicroRNAs: Emerging Players of Brain Function and Mental Illness” symposium, Washington D.C., USA
34. Mar 2008 1st HHMI RNA granules Meeting, Chevy Chase, Maryland, USA

Invited Seminars

Johns Hopkins University/Regional

35. Dec 2023 Chemical Biology Laboratory, National Cancer Institute, Frederick, Maryland (scheduled)
36. May 2022 **Student Invited Speaker**, Asian Americans and Pacific Islanders (AAPI) Heritage Month Journal Club, Graduate Student Association, Johns Hopkins University School of Medicine
37. Apr 2022 Department of Pharmacology and Molecular Sciences, Johns Hopkins University School of Medicine
38. Dec 2021 Chemistry–Biology Interface Forum, Johns Hopkins University
39. Dec 2021 Infectious Diseases Clinical and Research Topics Meeting, Division of Infectious Diseases, Johns Hopkins University School of Medicine
40. Nov 2021 Department of Biochemistry and Molecular Biology, Johns Hopkins Bloomberg School of Public Health,
41. Sep 2021 **Student Invited Speaker**, Johns Hopkins Chemistry–Biology Interface Graduate Program, Annual Retreat
42. May 2021 Johns Hopkins Chromatin & Chromosomes Workshop
43. Jul 2020 Gynecologic Oncology Fellows Lecture Series, Johns Hopkins University School of Medicine
44. Jul 2020 Institute for Basic Biomedical Sciences Covid-19/SARS-CoV-2 Summer Seminar Series, Johns Hopkins University School of Medicine
45. May 2020 Department of Molecular Biology and Genetics, Johns Hopkins University School of Medicine
46. April 2020 Department of Molecular Microbiology and Immunology, Johns Hopkins Bloomberg School of Public Health
47. Dec 2019 The Sherrilyn Ken Fisher Center for Environmental Infectious Diseases, Johns Hopkins University School of Medicine
48. Dec 2019 LunchLearnLink, Department of Environment Health and Engineering, Johns Hopkins Bloomberg School of Public Health
49. Nov 2019 RNA Club, National Institute of Health
50. Jun 2019 RNA seminar Series, Center for Cancer Research, National Cancer Institute
51. May 2019 Biology of Cancer Seminar, The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins
52. Apr 2019 Breast and Ovarian Cancer Program Seminar, The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins
53. Dec 2018 Chemistry–Biology Interface Forum, Johns Hopkins University
54. Dec 2018 Department of Biology, Krieger School of Arts and Sciences, Johns Hopkins University
55. Jun 2018 Oophest, Division of Gynecologic Pathology, Pathology Department, Johns Hopkins University School of Medicine
56. May 2018 Biology of Healthy Aging lecture series, National Institute of Aging
57. Mar 2018 The Sherrilyn Ken Fisher Center for Environmental Infectious Diseases, Johns Hopkins University School of Medicine

58. Dec 2017 RNA Club, University of Maryland
59. Sep 2017 **Student Invited Speaker**, Johns Hopkins Chemistry–Biology Interface Graduate Program 13th Annual Retreat, Baltimore, USA
60. May 2017 Breast Cancer Survivors' group, Johns Hopkins Hospital
61. May 2017 Breast Cancer Tumor Board Meeting, The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins
62. Feb 2017 Translational Research Conference, The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins
63. Dec 2016 Breast Cancer Tumor Board, The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins
64. Jun 2016 RNA seminar Series, Center for Cancer Research, National Cancer Institute
65. Mar 2016 Chemistry–Biology Interface Forum, Johns Hopkins University
66. Feb 2016 Department of Biochemistry and Molecular Biology, Johns Hopkins Bloomberg School of Public Health
67. Nov 2015 Department of Radiation Oncology and Molecular Radiation Sciences, Johns Hopkins University School of Medicine
68. Nov 2015 Laboratory of Cellular and Molecular Biology, National Cancer Institute
69. Sep 2015 Department of Biochemistry and Molecular Biology, Johns Hopkins Bloomberg School of Public Health
70. Sep 2015 Johns Hopkins Breast Cancer Survivorship Program
71. Jul 2015 **Fellow invited seminar**, Bayview Campus, National Institute of Aging
72. Mar 2014 **Student invited seminar**, Baltimore Life Scientist Association
73. Mar 2014 Breast Cancer Program Translational Research Seminar Series, Johns Hopkins University School of Medicine
74. Jun 2013 Tech Center for Networks and Pathways, Johns Hopkins University School of Medicine
75. Mar 2013 Department of Molecular and Comparative Pathobiology, Johns Hopkins University School of Medicine
76. Jan 2013 Carnegie Institute for Science
77. May 2012 Department of Cell Biology and Molecular Genetics, University of Maryland College Park
78. May 2012 RNA Club, National Institutes of Health
79. Apr 2012 Department of Biological Chemistry, Johns Hopkins University School of Medicine
80. Apr 2012 Brain Science Institute, Johns Hopkins University School of Medicine
81. Oct 2011 Institute of Genetic Medicine, Johns Hopkins University School of Medicine
82. Sep 2011 Department of Cell Biology, Johns Hopkins University School of Medicine
83. May 2011 Breast Cancer Program Translational Research Seminar Series, Johns Hopkins University School of Medicine
84. Apr 2010 Department of Biochemistry and Molecular Biology, Johns Hopkins Bloomberg School of Public Health

National

85. Jun 2024 Johns Hopkins All Children's Hospital, Florida (scheduled)
86. Apr 2024 **15th Lundberg-Kienlen Lecture**, Oklahoma Center for Respiratory and Infectious Diseases (scheduled)
87. Apr 2024 University of North Carolina (scheduled)
88. Feb 2024 St. Jude's Children Hospital, Tennessee (scheduled)
89. Jan 2024 University of Illinois, Urbana-Champaign, Illinois
90. May 2023 M.D. Anderson Cancer Center, The University of Texas, Houston, Texas
91. Apr 2023 Massachusetts Institute of Technology, Koch Institute, Cambridge, Massachusetts
92. Apr 2023 Tufts University, Department of Chemistry, Medford, Massachusetts
93. May 2022 University of Minnesota, Department of Pharmacology, Minneapolis, Minnesota
94. Mar 2022 University of Illinois at Urbana-Champaign, Department of Cell & Developmental Biology, Champaign, Illinois
95. Jul 2021 NCI Program Structural Biology of DNA Repair (SBDR) group (webinar)

96. Apr 2021 Columbia University, Social DNAing (webinar)
97. Apr 2021 Boston University, Genome Science Institute (webinar)
98. Mar 2021 Medical University of South Carolina, Department of Biochemistry and Molecular Biology, Charleston, South Carolina (webinar)
99. Aug 2020 Pfizer, External Science & Innovation (webinar)
100. Jul 2020 Johns Hopkins All Children's Hospital, St. Petersburg, Florida (postponed due to COVID-19)
101. Jun 2020 Third Rock Ventures, Boston, Massachusetts (webinar)
102. May 2020 St. Jude Children's Research Hospital, Memphis, Tennessee (webinar)
103. Jul 2019 Wistar Institute, Philadelphia, Pennsylvania
104. Apr 2019 University of Michigan, Center for RNA Biomedicine, Ann Arbor, Michigan
105. Mar 2019 University of Delaware, Department of Medical and Molecular Sciences, Newark, Delaware
106. Mar 2019 Baylor College of Medicine, Department of Molecular Physiology and Biophysics, Houston, Texas
107. Feb 2019 Third Rock Ventures, Boston, Massachusetts
108. Jul 2018 Ribon Therapeutics, Inc., Lexington, Massachusetts
109. Apr 2018 University of South Carolina, College of Pharmacy, Columbia, South Carolina
110. Apr 2018 The University of Alabama at Birmingham, Department of Chemistry, Birmingham, Alabama
111. Jan 2017 Ribon Therapeutics, Inc., Lexington, Massachusetts
112. Nov 2016 **Student invited seminar**, Catholic University of America, Biology Department, Washington D.C.
113. Sep 2016 University of Pennsylvania, Department of Biochemistry and Biophysics, Philadelphia, Pennsylvania
114. Jun 2015 Penn State College of Medicine, Department of Biochemistry and Molecular Biology, Hershey, Pennsylvania
115. Mar 2012 University of Washington, Department of Pharmacology, Seattle, Washington
116. Nov 2011 U.S. Air Force Office of Scientific Research, San Antonio, Texas
117. Apr 2011 New England RNA Data Club, Harvard Medical School, Boston, Massachusetts
118. Apr 2010 Harvard University School of Public Health, Department of Genetics and Complex Diseases, Boston, Massachusetts
119. Apr 2010 Rockefeller University, New York
120. Apr 2010 Columbia University Medical Center, Department of Biochemistry and Molecular Biophysics, New York
121. Mar 2010 Buck Institute, San Francisco, California
122. Feb 2010 Cleveland Clinic, Lerner Research Institute, Cleveland, Ohio
123. Feb 2010 Duke University Medical Center, Department of Biochemistry, Durham, North Carolina
124. Jan 2010 New York University, Center for Genomics & Systems Biology, New York

International

125. May 2024 Laval University, Quebec, Canada
126. Jun 2022 Leiden University, Leiden, Netherlands
127. Nov 2018 Université de Montréal, Département de biochimie, Montréal, Quebec, Canada
128. Oct 2018 Johns Hopkins Alumni Association Hong Kong, Hong Kong, China
129. May 2017 University of Oxford, Department of Biochemistry, Oxford, UK
130. Jun 2011 Osaka University, Immunology Frontier Research Center, Osaka, Japan
131. Jun 2011 Academia Sinica, Genomics Research Center, Taipei, Taiwan
132. Jun 2011 Hong Kong University of Science and Technology, Division of Life Science, Hong Kong, China
133. Feb 2010 London Research Institute, Cancer Research UK, London, UK

ADDITIONAL INFORMATION

Personal statement of research and practice goals, objectives and impact

My research focuses on identifying mechanisms of gene regulation, specifically on how to control ribonucleic acids (RNA)—the initial products of *all* genes. As dysregulated RNA control can drive diseases such as cancers and viral infection, I have also been actively translating my discoveries into diagnostics and therapeutics, resulting in multiple inventions and patents.

Since joining Hopkins in 2011, I have been focusing my research to study how RNA metabolism is controlled by a regulator called poly(ADP-ribose) (PAR). PAR is an RNA-like polymer and post-translational modification (*i.e.*, ADP-ribosylation) that regulates diverse functions in cells, such as DNA repair, RNA metabolism, and biomolecular condensation. Although PAR polymerase (PARP) inhibitors are recently FDA-approved for treating cancers, the fundamental biology and physical properties of this regulator remain mostly uncharacterized partly due to a woeful lack of tools. For example, although PAR was discovered in 1963, not until recently the identity of ADP-ribosylated substrates and proteins binding to the polymer remained unknown. Over the last decade, my team has achieved multiple “firsts” in tool inventions critical for dissecting the molecular underpinning of PAR and ADP-ribosylation, including one of the first proteomics methods to identify endogenous ADP-ribosylated sites and PAR binders, the first substrate informatics portal ADPriboDB (>1,000,000 hits since inception in 2016), and the first bioconjugation technology ELTA to label PAR. Particularly, this ELTA technology opens up opportunities for profiling the length of PAR in cells, measurement of the protein-PAR affinity and enrichment of endogenous ADP-ribosylated substrates for site identification at sub-femtomole sensitivity. Using these tools, we recently discovered that ADP-ribosylation regulation is critical for the replication and virulence of alphaviruses. Given that regulation is also conserved in coronaviruses, these findings lead me to develop therapeutics to treat diseases caused by these RNA viruses. This research direction took a heightened relevance when the COVID-19 pandemic struck, and we are developing an antiviral drug program.

Finally, we have made fundamental discoveries regarding RNA regulation. RNA encodes information not only in its nucleotide sequences but also in its folded structures formed through base-pairing. We discovered a genome-wide pathway, termed Structure-mediated RNA Decay (SRD), that recognizes overall RNA structure density as a signal for degradation. This unexpected discovery reframes the current understanding of how RNA is degraded. We are delineating the rules and mechanisms of how SRD recognizes targets using a computational–experimental approach. Given that SRD revealed a new paradigm to read RNA, we are using overall RNA structure density as a novel metric to re-assess existing RNA-seq data, such as those deposited in The Cancer Genome Atlas.

My leadership and expertise in the area of gene regulation are widely recognized in the field. For example, I chair sessions in research meetings, serve as a consultant for biotech companies, and regularly sit on editorial boards and grant panels on RNA, ADP-ribosylation and proteomics. I am also deeply committed to outreach activities: I go beyond the bench by actively engaging the public with science, promoting direct conversations between basic scientists and cancer survivors.

Keywords

Gene regulation, RNA metabolism, Post-translational modifications, ADP-ribosylation, PARP biology, RNA structure, RNA virus, RNA granules, Biomolecular condensates, Proteomics.