Arvind Rasi Subramaniam
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Education

Ph.D. in Physics, University of Chicago	2008
B.Tech. in Metallurgical and Materials Engineering, Indian Institute of Technology Madras, India	2004

Employment

Associate Professor	2021–
Assistant Professor	2015–21
Basic Sciences Division & Computational Biology Section of Public Health Sciences Division Fred Hutchinson Cancer Center, Seattle, WA	
Postdoctoral Fellow	2008–15
Center for Systems Biology & Department of Molecular and Cellular Biology Harvard University, Cambridge, MA. Advisors: Erin O'Shea, Phillippe Cluzel	
Graduate Fellow	2005–08
Theoretical Condensed Matter Physics Group University of Chicago, Chicago, IL. Advisor: Ilya Gruzberg	

Other Appointments

Affiliate Associate Professor, Department of Genome Sciences, University of Washington, Seattle	2016–
Affiliate Associate Professor, Department of Biochemistry, University of Washington, Seattle	2016–
Affiliate Associate Professor, Department of Microbiology, University of Washington, Seattle	2018–
Participant in the Program on 'Random Shapes', Institute for Pure and Applied Mathematics, UCLA	2007
Visiting Affiliate in the Program on 'Stochastic Geometry and Field Theory', Kavli Institute for Theoretical Physics, UCSB	2006
Graduate Research Fellow, Experimental Condensed Matter Physics, University of Chicago, Advisor: Thomas Rosenbaum	2004–05
Summer Undergraduate Research Fellow, Material Science & Engineering, California Institute of Technology, Advisor: Sossina Haile	2003
Summer Research Fellow, Department of Physics, Indian Institute of Science, Bangalore, Advisor: Arup Kumar Raychaudhuri	2002

Honors

Transformative Research Award, National Institutes of Health	2023
CAREER Award, National Science Foundation	2018
Sidney Kimmel Scholar	2017
K99/R00 Pathway to Independence Award, National Institutes of Health	2013
Wentzel Research Prize for Outstanding Research in Theoretical Physics, University of Chicago	2007
Chandrasekhar, McCormick, and Sachs Graduate Research Fellowships, University of Chicago	2004
Dhandapani Memorial Prize for highest GPA in Metallurgical and Materials Engineering, IIT Madras	2004

Invited Talks

EMBO Conference on RNA Meets Protein Decay, Vienna	2025
Departmental Seminar, Computational & Systems Biology, University of Pittsburgh, Pittsburgh	2025
Departmental Seminar, Biochemistry and Molecular Biology, University of Chicago, Chicago	2024
Departmental Seminar, Chemistry and Biochemistry, University of California, San Diego	2023
Gordon Research Conference on Translational Machinery in Health and Disease, Galveston	2023
Emergent Simplicity in Biophysical Dynamics TSRC workshop, Telluride	2019
Department of Molecular Biology and Genetics, Johns Hopkins University School of Medicine, Baltimore	2014

Teaching

Lead Instructor, MCB 536: Tools for Computational Biology, University of Washington, Seattle	2018–25
Teaching Assistant, Foundations of Systems Biology and Bioengineering, Harvard University	2012
Teaching Assistant, Introduction to Quantitative Tools for Cell Biology, Harvard University	2010
Teaching Assistant, Symplectic Methods of Classical Dynamics, University of Chicago	2008
Teaching Assistant, Advanced Mathematical Methods of Physics, University of Chicago	2008
Teaching Assistant, Solid State Physics, University of Chicago	2007

Ph.D. Trainees

Heather Borror, Molecular and Cellular Biology, University of Washington	2024–
Katharine Chen, Molecular and Cellular Biology, University of Washington	2019–23
Patrick Nugent, Molecular and Cellular Biology, University of Washington	2018–24
Ty Bottorff, Biophysics, Structure and Design Graduate Program, University of Washington	2019–23
Philip Burke, Microbiology, University of Washington (joint with Jesse Bloom)	2017–22
Heather Machkovech, Genome Sciences, University of Washington (joint with Jesse Bloom)	2016–18

Postdoctoral Trainees

Patrick Nugent	2024–
Jamie Yelland	2023–
Matthew Chan (joint with Melody Campbell)	2022–
Maria Toro Moreno (joint with Harmit Malik)	2021–
Rachael Bakker	2021–25
Heungwon Park	2016–19
Michelle Kriner	2016–18

Research Technician Trainees

Shannon Marschall (joint with Akhila Rajan)	2023–
Yuya Zhao	2018–20
Shea Ransford	2017–18
Michael ‘Max’ Ferrin	2015–17

Ph.D. Thesis Committee

Serwah Danquah, Molecular Medicine and Mechanisms of Disease Program, University of Washington	2025–
Kristian Davidsen, Molecular and Cellular Biology, University of Washington	2020–24
Alison Greenlaw, Molecular and Cellular Biology, University of Washington	2020–23
Alexandre Germanos, Molecular and Cellular Biology, University of Washington	2019–23
Samantha Schuster, Molecular and Cellular Biology, University of Washington	2019–23
Bianca Ruiz, Genome Sciences, University of Washington	2018–21
Dylan Udy, Molecular and Cellular Biology, University of Washington	2017–22
Joey Pangallo, Molecular and Cellular Biology, University of Washington	2016–21

Ethan Keeler, Electrical Engineering, University of Washington	2016–18
Robin Green, Molecular and Cellular Biology, University of Washington	2015–17
Qing Feng, Molecular and Cellular Biology, University of Washington	2015–17

Internal Service

Eddie Méndez Award Committee, Fred Hutchinson Cancer Research Center	2021
Faculty Search Committee, Basic Sciences Division, Fred Hutchinson Cancer Research Center	2020,23
Organizer, Computational Biology Seminar Series, Fred Hutchinson Cancer Research Center	2017–21
Weintraub Graduate Student Award Selection Committee, Fred Hutchinson Cancer Research Center	2017,20
Admissions Committee, Biophysics, Structure, & Design Graduate Program, University of Washington	2017–18
Admissions Committee, Molecular and Cellular Biology Graduate Program, University of Washington	2016,17,21
Organizer, Microbial Sciences Initiative Journal Club, Harvard University	2010
Organizer, Metallurgical and Materials Engineering Student Association, IIT Madras, India	2002–03

External Service

Session chair, RNA Meets Protein Decay conference, Vienna	2025
Ad-hoc member of of NIH ZRG1 MGG-F (55) panel for R35 MIRA	2025
Member of NSF MCB panel	2020,22
Reviewer for Regeneron Science Talent Search Competition	2018

Ad-hoc journal referee for Nature, Molecular Cell, Reviewer Commons, PNAS, PLoS Biology, eLife, Cell Reports, Nature Communications, Nature Microbiology, Physical Biology, Physical Review Letters, Physical Review B

Ad-hoc grant reviewer for US National Science Foundation, US-Israel Binational Foundation, Research Foundation — Flanders Belgium, Swedish Foundation for Strategic Research, Israel Ministry of Science and Technology, Swiss National Science Foundation

Extramural Research Support

Current

NIH R35 GM119835 (PI) 2016–26
Regulation of Protein Synthesis by Synonymous Codon Usage
Current Direct Costs: $241,973/yr

NIH R01 AT012826 (Co-PI) 2023–28
Unraveling Microprotein Biology with an Evolutionary-Immunological Framework
Current Direct Costs to Subramaniam lab: $225,000/yr

Completed

NSF CAREER MCB-1846521 (PI) 2019–24
Experimentally Integrated Modeling of Quality Control During Eukaryotic mRNA Translation

Sidney Kimmel Scholarship (PI) 2017–19
Quantitative Profiling of Synonymous Mutation Effects in Cancer Cells

NIH K99/R00 GM107113 (PI) 2013–17
Role of Synonymous Codon Usage as Gene Regulators in Bacteria and Cancer Cells

Preprints & Publications

† indicates *corresponding author; Subramaniam lab members are underlined.*

1. Bakker RA, Nicholson OB, Park H, Xiao YL, Tang W, Subramaniam AR †, Lapointe CP †. *Deaminase-based RNA recording enables high throughput mutational profiling of protein-RNA interactions.* **bioRxiv** 2025.04.11.648485, **(2025)**. PMCID: 12027372

2. Nugent PJ, Park H, Wladyka CL, Yelland J, Sinha S, Chen KY, Quarterman G, Bynum C, Lee SC, Hsieh AC, Subramaniam AR †. *Decoding post-transcriptional regulatory networks by RNA-linked CRISPR screening in human cells.* **Nature Methods** 22:1237 **(2025)**. PMID: 40442371

3. Chen KY, Toro-Moreno M †, Subramaniam AR †. *GitHub enables collaborative and reproducible laboratory research.* **PLoS Biology** 23(2):e3003029 **(2025)**. PMCID: 11828340

4. Chen KY, Park H, Subramaniam AR †. *Massively parallel identification of sequence motifs triggering ribosome-associated mRNA quality control.* **Nucleic Acids Research** 52:7171 **(2024)**. PMCID: 11229359

5. Hou W, Harjono V, Harvey AT, Subramaniam AR, Zid BM †. *Quantification of elongation stalls and impact on gene expression in yeast.* **RNA** 29:1928 **(2023)**. PMCID: 10653389

6. Jana S, Brahma S, Arora S, Wladyka CL, Hoang P, Blinka S, Hough R, Horn JL, Liu Y, Wang LJ, Depeille P, Smith E, Montgomery RB, Lee JK, Haffner MC, Vakar-Lopez F, Grivas P, Wright JL, Lam HM, Black PC, Roose JP, Ryazanov AG, Subramaniam AR, Henikoff S, Hsieh AC †. *Transcriptional-translational conflict is a barrier to cellular transformation and cancer progression.* **Cancer Cell** 41:853 **(2023)**. PMCID: 10208629

7. Burke PC, Park H, Subramaniam AR †. *A nascent peptide code for translational control of mRNA stability in human cells.* **Nature Communications** 13:6829 **(2022)**. PMCID: 9652226

8. Bottorff TA, Park H, Geballe AP †, Subramaniam AR †. *Translational buffering by ribosome stalling in upstream open reading frames.* **PLoS Genetics** 18(10):e1010460 **(2022)**. PMCID: 9648851

9. Farooq Z, Kusuma F, Burke P, Dufour CR, Lee D, Tabatabaei N, Toboz P, Radovani E, Greenblatt JF, Rehman J, Class J, Khoutorsky A, Fonseca BD, Richner JM, Mercier E, Bourque G, Giguère V, Subramaniam AR, Han J, Tahmasebi S †. *The amino acid sensor GCN2 suppresses terminal oligopyrimidine (TOP) mRNA translation via La-related protein 1 (LARP1).* **Journal of Biological Chemistry** 298:102277 **(2022)**. PMCID: 9396407

10. Clough CA, Pangallo J, Sarchi M, Ilagan JO, North K, Bergantinos R, Stolla MC, Naru J, Nugent P, Kim E, Stirewalt DL, Subramaniam AR, Abdel-Wahab O, Abkowitz JL, Bradley RK †, Doulatov S †. *Coordinated missplicing of TMEM14C and ABCB7 causes ring sideroblast formation in SF3B1-mutant myelodysplastic syndrome.* **Blood** 139:2038 **(2022)**. PMCID: 8972092

11. Kriner MA, Subramaniam AR †. *The serine transporter SdaC prevents cell lysis upon glucose depletion in Escherichia coli.* **MicrobiologyOpen** 9:e960 **(2020)**. PMCID: 7002108

12. Green R, Sonal, Wang L, Hart SFM, Lu W, Skelding D, Burton JC, Mi H, Capel A, Chen HA, Lin A, Subramaniam AR, Rabinowitz JD, Shou W †. *Metabolic excretion associated with nutrient-growth dysregulation promotes the rapid evolution of an overt metabolic defect.* **PLoS Biology** 18:e3000757 **(2020)**. PMCID: 7470746

13. Machkovech HM, Bloom JD †, Subramaniam AR †. *Comprehensive profiling of translation initiation in influenza virus infected cells.* **PLoS Pathogens** 15(1):e1007518 **(2019)**. PMCID: 6361465

14. Park H, Subramaniam AR †. *Inverted translational control of eukaryotic gene expression by ribosome collisions.* **PLoS Biology** 17(9):e3000396 **(2019)**. PMCID: 6750593

15. Darnell AM, Subramaniam AR †, O'Shea EK †. *Translational control through differential ribosome pausing during amino acid limitation in mammalian cells.* **Molecular Cell** 71:229 **(2018)**. PMCID: 6516488

16. Ferrin MA, Subramaniam AR †. *Kinetic modeling predicts a stimulatory role for ribosome collisions at elongation stall sites in bacteria.* **eLife** 6:e23629 **(2017)**. PMCID: 5446239

Prior to 2015

1. Subramaniam AR, Zid B, O'Shea EK. An integrated approach reveals regulatory controls on bacterial translation elongation. *Cell* 159:1200 (2014). PMCID: 4243059

2. Subramaniam AR, DeLoughery A, Bradshaw N, Chen Y, O'Shea EK, Losick R, Chai Y. A serine sensor for multicellularity in a bacterium. *eLife* 2:e01501 (2013). PMCID: 3862929

3. Subramaniam AR, Pan T, Cluzel P. Environmental perturbations lift the degeneracy of the genetic code to regulate protein levels in bacteria. *PNAS* 110:2419 (2013). PMCID: 3568297

4. Obuse H, Subramaniam AR, Furusaki A, Gruzberg IA, Ludwig AWW. Conformal invariance, multifractality, and finite-size scaling at Anderson localization transitions in two dimensions. *Physical Review B* 82:035309 (2010). DOI

5. Subramaniam AR, Gruzberg IA, Ludwig AWW. Boundary criticality and multifractality at the 2D spin quantum Hall transition. *Physical Review B* 78:245105 (2008). DOI

6. Obuse H, Subramaniam AR, Furusaki A, Gruzberg IA, Ludwig AWW. Boundary multifractality at the integer quantum Hall plateau transition: implications for the critical theory. *Physical Review Letters* 101:116802 (2008). DOI

7. Obuse H, Subramaniam AR, Furusaki A, Gruzberg IA, Ludwig AWW. Corner multifractality for reflex angles and conformal invariance at 2D Anderson metal-insulator transition with spin-orbit scattering. *Physica E* 40:1404 (2008). DOI

8. Jia X, Subramaniam AR, Gruzberg IA, Chakravarty S. Entanglement entropy and multifractality at localization transitions. *Physical Review B* 77:014208 (2008). DOI

9. Obuse H, Subramaniam AR, Furusaki A, Gruzberg IA, Ludwig AWW. Multifractality and conformal invariance at 2D metal-insulator transition in the spin-orbit symmetry class. *Physical Review Letters* 98:156802 (2007). DOI

10. Mildenberger A, Subramaniam AR, Narayanan R, Evers F, Gruzberg IA, Mirlin AD. Boundary multifractality in critical 1D systems with long-range hopping. *Physical Review B* 75:094204 (2007). DOI

11. Subramaniam AR, Gruzberg IA, Ludwig AWW, Evers F, Mildenberger A, Mirlin AD. Surface criticality and multifractality at localization transitions. *Physical Review Letters* 96:126802 (2006). DOI