


# Sethuramasundaram Pitchiaya

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## PROFESSIONAL APPOINTMENTS

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<b>Assistant Professor</b> Michigan Medicine, Department of Urology and Department of Pathology, Ann Arbor, MI, USA	2021 - present
<b>Research Investigator</b> Michigan Medicine, Department of Pathology, Ann Arbor, MI, USA	2017 - 2021

## EDUCATION AND TRAINING

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<b>Postdoctoral Fellow (Cancer Biology)</b> Michigan Medicine, Ann Arbor, MI, USA Mentor: Arul M. Chinnaiyan	2015 - 2017
<b>Postdoctoral Fellow (Molecular and Cell Biology, Instrumentation and Biophysics)</b> University of Michigan, Ann Arbor, MI, USA Single-molecule analysis in Real-Time (SMART) center	2014 - 2015 2012 - 2013
<b>Ph.D. in Chemistry (Chemical Biology)</b> University of Michigan, Ann Arbor, MI, USA Mentor: Nils G. Walter, GPA: 4.0 / 4.0	2006 - 2012
<b>B.Tech in Industrial Biotechnology</b> Anna University, Chennai, Tamil Nadu, India GPA: 9.24 / 10.00, (equivalent to) summa cum laude	2002 - 2006

## RESEARCH INTERESTS

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Regulation of gene expression  
RNA biology  
Cancer biology  
Single-cell analysis  
Single-molecule imaging

## FUNDING

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<b>Principal Investigator</b> Idea Development Award (\$996,000) Department of Defense (Prostate Cancer Research Program)	2019 - 2022
Young Investigator Award (\$225,000) Prostate Cancer Foundation <a href="https://www.pcf.org/c/young-investigator-award-class-of-2018/">https://www.pcf.org/c/young-investigator-award-class-of-2018/</a>	2018 - 2021
SPORE Career Enhancement Award (\$120,000) National Cancer Institute	2017 - 2019

AACR-Bayer Prostate Cancer Research Fellowship (\$60,000) American association for Cancer Research <b>Featured by AACR for Sethu Pitchiaya's promising research:</b> <a href="http://blog.aacr.org/a-young-chemical-biologist-forges-a-career-path-in-cancer-research/">http://blog.aacr.org/a-young-chemical-biologist-forges-a-career-path-in-cancer-research/</a>	2016 - 2017
<b>Co-Investigator</b>	
P30 Supplementary Award (PI: Arul M. Chinnaiyan, \$390,000) National Cancer Institute	2020 - 2021
Technology Impact Award (Co-PI: Marcin Cieslik, \$200,000) Cancer Research Institute	2019 - 2021
Prostate SPORE (PI: Arul M. Chinnaiyan, Ganesh Palapattu and Elizabeth Heath, \$11,887,759) National Cancer Institute	2019 - 2024
Outstanding Investigator Award (PI: Arul M. Chinnaiyan, \$4,200,000) National Cancer Institute	2018 - 2025

## PUBLICATIONS

Google Scholar: <https://scholar.google.com/citations?user=fIPaAgUAAAAJ&hl=en&oi=ao>

Citations: 1537, \* Equal Contribution, # corresponding author

- Zhang Y\*, Narayanan SP\*, Mannan R, Raskind G, Wang X, Vats P, Su F, Hosseini N, Cao X, Kumar-Sinha C, Ellison SJ, Giordano TJ, Morgan TM, **Pitchiaya S**, Alva A, Mehra R, Cieslik M, Dhanasekaran SM, Chinnaiyan AM#, Single Cell Analyses of Renal Cell Cancers Reveal Insights into Tumor Microenvironment, Cell of Origin, and Therapy Response, *PNAS* (2021), 118:1 (epub)
- Peltier D\*, Radosevich M, Decoville T, **Pitchiaya S**, Wood SC, Hou G, Zajac C, Oravec-Wilson K, Sokol D, Henig I, Wu J, Kim S, Taylor A, Fujiwara H, Sun Y, Chinnaiyan AM, Goldstein DR and Reddy P#, RNA-seq of Human T-Cells After Hematopoietic Stem Cell Transplantation Identifies Linc00402 as a Novel Regulator of T-Cell Alloimmunity. *Science Translational Medicine* (2021), 13:1 (epub)
- Zaslavsky A#, Adams M, Cao X, Hawley M, Henderson J, Busch-Ostergren P, Udager A, **Pitchiaya S**, Tourdot B, Kasputis T, Church SJ, Lee SK, Ohl S, Patel S, Morgan TM, Alva A, Wakefield TW, Reichert Z, Holinstat M and Palapattu GS#. Antisense oligonucleotides and nucleic acids generate hypersensitive platelets. *Thrombosis research* (2021), 200:64
- Jalihal AP, Schmidt A, Gao G, Little SR, **Pitchiaya S** and Nils G. Walter#, Hyperosmotic phase separation: Condensates beyond inclusions, granules and organelles, *Journal of Biological Chemistry* (2021) 296:100044
- Qiao Y\*, Wang X\*, Mannan R\*, **Pitchiaya S**, Zhang Y, Wotring JW, Xiao L, Robinson DR, Wu Y, Tien JC, Cao X, Simko SA, Apel IJ, Kregel S, Narayanan SP, Raskind G, Ellison SJ, Parolia A, Zelenka-Wang S, McMurry L, Su F, Wang R, Cheng Y, Delekta AD, Mei Z, Pretto CD, Wang S, Mehra R#, Sexton JZ# and Chinnaiyan AM#, Targeting transcriptional regulation of SARS-CoV-2 entry factors ACE2 and TMPRSS2, *PNAS* (2021), 118:1 (epub)
- Jalihal AP\*, **Pitchiaya S**#, Xiao L, Bawa P, Jiang X, Bedi K, Cieslik M, Ljungman M, Chinnaiyan AM# and Walter NG#, Multivalent proteins rapidly and reversibly phase-separate upon osmotic cell volume change. *Molecular Cell* (2020), 79:978  
**Featured in Majumder et al., Molecular Cell, 2020 (Preview)**
- Shankar S, Tien JC, Siebenaler RF, Chugh S, Dommeti VL, Zelenka-Wang S, Wang XM, Apel IJ, Waninger J, Eyunni S, Xu A, Mody M, Goodrum A, Zhang Y, Tesmer JJ, Mannan R, Cao X, Vats P, **Pitchiaya S**, Shi J, Kumar-Sinha C, Crawford H and Chinnaiyan AM. An Essential Role for Argonaute 2 in EGFR-KRAS Signaling in Pancreatic Cancer Development. *Nature Communications* (2020), 11:2817
- Pitchiaya S**#, Mourao MDA, Jalihal AP, Xiao L, Jiang X, Chinnaiyan AM, Schnell S and Walter NG#, Dynamic recruitment of single RNAs to processing bodies depends on RNA functionality. *Molecular Cell* (2019), 74:521  
**Featured in Chowdhury et al., Molecular Cell, 2019 (Preview)**

9. Parolia A\*, Cieslik M\*, Chu SC, Xiao L, Ouchi T, Zhang Y, Wang X, Vats P, Cao X, **Pitchiaya S**, Su F, Wang R, Feng FY, Wu YM, Lonigro RJ, Robinson DR and Chinnaiyan AM#. Distinct structural classes of activating FOXA1 alterations in advanced prostate cancer. *Nature* (2019), 571:413

**Featured in Stone L, Nature Reviews Urology, 2019 (In Brief)**

10. Zhang Y\*, **Pitchiaya S\***, Cieslik M\*, Niknafs YS, Tien JC, Hosono Y, Iyer MK, Yazdani S, Subramaniam S, Shukla SK, Jiang X, Wang L, Liu TY, Uhl M, Gawronski AR, Qiao Y, Xiao L, Dhanasekaran SM, Juckette KM, Kunju LP, Cao X, Patel U, Batish M, Shukla GC, Paulsen MT, Ljungman M, Jiang H, Mehra R, Backofen R, Sahinalp CS, Freier SM, Watt AT, Guo S, Wei JT, Feng FY, Malik R and Chinnaiyan AM#, Analysis of the androgen receptor-regulated lncRNA landscape identifies a role for ARLNC1 in prostate cancer progression, *Nature Genetics* (2018), 50:814

11. Hosono Y\*, Niknafs YS\*, Prensner JR, Iyer MK, Dhanasekaran SM, Mehra R, **Pitchiaya S**, Tien J, Escara-Wilke J, Poliakov A, Chu SC, Saleh S, Sankar K, Su F, Guo S, Qiao Y, Freier SM, Bui HH, Cao X, Malik R, Johnson TM, Beer DG, Feng FY, Zhou W and Chinnaiyan AM#, Oncogenic Role of THOR, a Conserved Cancer/Testis Long Noncoding RNA. *Cell* (2017), 171:1559

12. Michelini F, **Pitchiaya S**, Vitelli V, Sharma S, Gioia U, Pessina F, Cabrini M, Wang Y, Capozzo I, Iannelli F, Matti V, Francia S, Shivashankar GV, Walter NG and d'Adda di Fagagna F#, Damage-induced lncRNAs control the DNA damage response through interaction with DDRNAs at individual double-strand breaks. *Nature Cell Biology* (2017), 19:1400

**Featured in Storici et al., Nature Cell Biology, 2017 (News & Views)**

13. **Pitchiaya S**, Heinicke LA, Park JI, Cameron E and Walter NG#, Resolving sub-cellular miRNA trafficking and turnover at single-molecule resolution. *Cell Reports* (2017), 19:630

14. Wang X, Qiao Y, Asangani IA, Ateeq B, Poliakov A, Ciešlik M, **Pitchiaya S**, Chakravarthi BVSK, Cao X, Jing X, Wang CX, Apel IJ, Wang R, Tien JC, Juckette KM, Yan W, Jiang H, Wang S, Varambally S and Chinnaiyan AM#, Development of peptidomimetic inhibitors of the ERG gene fusion product in prostate cancer. *Cancer Cell* (2017), 31:532

15. Rossiello F, Aguado J, Sepe S, Iannelli F, Nguyen Q, **Pitchiaya S**, Carninci P and d'Adda di Fagagna F#, DNA damage response inhibition at dysfunctional telomeres by modulation of telomeric DNA damage response RNAs. *Nature Communications* (2017), 8:13980

16. Niknafs YS\*, Han S\*, Ma T, Speers C, Zhang C, Wilder-Romans K, Iyer MK, **Pitchiaya S**, Malik R, Hosono Y, Prensner JR, Poliakov A, Singhal U, Xiao L, Kregel S, Siebenaler RF, Zhao SG, Uhl M, Gawronski A, Hayes DF, Pierce LJ, Cao X, Collins C, Backofen R, Sahinalp CS, Rae JM, Chinnaiyan AM# and Feng FY#, The lncRNA landscape of breast cancer reveals a role for DSCAM-AS1 in breast cancer progression. *Nature Communications* (2016), 7:12791

17. Shankar S, **Pitchiaya S**, Malik R, Kothari V, Hosono Y, Yocum AK, Gundlapalli H, White Y, Firestone A, Cao X, Dhanasekaran SM, Stuckey JA, Bollag G, Shannon K, Walter NG, Kumar-Sinha C and Chinnaiyan AM#, KRAS engages AGO2 to enhance cellular transformation. *Cell Reports* (2016), 14:1448

**Featured in Kiberstis PA, Science, 2016 (Editor's choice)**

18. Nyati S, Schinske-Sebolt K, **Pitchiaya S**, Chekhovskiy K, Chator A, Chaudhry N, Dosch J, Van Dort ME, Varambally S, Kumar-Sinha C, Nyati MK, Ray D, Walter NG, Yu H, Ross BD and Rehemtulla A#, The kinase activity of the Ser/Thr kinase BUB1 promotes TGF- $\beta$  signaling. *Science Signaling* (2015), 8:ra1

**Featured in Moustakas et al., Science Signaling, 2015 (Focus) and Barcellos-Hoff MH, Neoplasia, 2015 (Commentary)**

19. Bartke RM, Cameron EL, Cristie-David AS, Custer TC, Denies MS, Daher M, Dhakal S, Ghosh S, Heinicke LA, Hoff JD, Hou Q, Kahlscheuer ML, Karlake J, Krieger AG, Li J, Li X, Lund PE, Vo NN, Park J, **Pitchiaya S**, Rai V, Smith DJ, Suddala KC, Wang J, Widom JR and Walter NG#, Meeting report: SMART timing-principles of single molecule techniques course at the University of Michigan 2014. *Biopolymers* (2015), 103:296

20. **Pitchiaya S\***, Heinicke LA\*, Custer TC\* and Walter NG#, Single molecule fluorescence approaches shed light on intracellular RNAs. *Chemical Reviews* (2014), 114:3224

**Featured in F1000 prime**

21. **Pitchiaya S**, Krishnan V, Custer TC and Walter NG#, Dissecting non-coding RNA mechanisms in cellulo by single molecule high resolution localization and counting. *Methods* (2013), 63:188

22. Ma J, Liu Z, Michelotti N, **Pitchiaya S**, Veerapaneni RS, Androsavich JR, Walter NG and Yang W<sup>#</sup>, High-resolution three-dimensional mapping of mRNA export through the nuclear pore. *Nature Communications* (2013), 4:2414
23. **Pitchiaya S**, Androsavich JR and Walter NG<sup>#</sup>, Intracellular single molecule microscopy reveals two kinetically distinct pathways for microRNA assembly. *EMBO reports* (2012), 13:709
24. Kuszak AJ, **Pitchiaya S**, Anand JP, Mosberg HI, Walter NG and Sunahara RK<sup>#</sup>, Purification and functional reconstitution of monomeric  $\mu$ -opioid receptors: Allosteric modulation of agonist binding by Gi2. *Journal of Biological Chemistry* (2009), 284:26732
25. **Pitchiaya S** and Krishnan Y<sup>#</sup>, First blueprint, now bricks: DNA as construction material on the nanoscale. *Chemical Society Reviews* (2006), 35:1111

## PATENTS AND DISCLOSURES OF INVENTIONS

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1. Cieslik M and **Pitchiaya S**, TCR-FISH: A Novel Method for Spatially and Clonally Resolved Profiling of Tumor-Infiltrating Lymphocytes. Invention disclosure filed with the University of Michigan's Office of Technology Transfer, filed Feb 2020
2. Chinnaiyan AM, Pandian B and **Pitchiaya S**, Spatial Registration Software for Adaptive Imaging. Invention disclosure filed with the University of Michigan's Office of Technology Transfer, filed June 2018
3. Chinnaiyan AM, Malik R, Zhang Y, Cieslik M and **Pitchiaya S**, Compositions and methods for treating cancer / ARInC1 in Prostate Cancer Progression. U.S. Provisional Patent Application No. 62/655,308, filed April 2018

## AWARDS AND HONORS

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Young investigator award, Prostate Cancer Foundation	2018
AACR-Bayer prostate cancer research fellowship	2016
Travel fellowship, RNA Society	2016, 2012
Travel fellowship, Cold Spring Harbor Laboratory	2013
Best poster award , Vaughan symposium, University of Michigan	2011, 2008
Travel grant , Rackham graduate school, University of Michigan	2010, 2009
Summer research fellowship , National Center for Biological Sciences, India	2005, 2004

## PRESENTATIONS

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### **Invited Talks**

Cancer Institute (WIA), Chennai, India	2020
Indian Institute of Science, Bangalore, India	2018
Indian Institute of Science Education and Research, Pune, India	2014
National Center for Biological Sciences, Bangalore, India	2014
Indian Institute of Technology, Chennai, India	2014
Principles of Single Molecule Techniques, Ann Arbor, MI, USA	2014
Zing – Nucleic Acids Conference, Playa del Carmen, Quintana Roo, Mexico	2012

### **Selected Talks**

Gordon-Merck Research Seminar- Post Transcriptional Gene Regulation, Newport, RI, USA	2014
Annual Meeting of the RNA Society, Ann Arbor, MI, USA	2012
Rustbelt RNA Meeting, Dayton, OH, USA	2011

**Invited Posters**

SPORE – Prostate Cancer Meeting, Ft. Lauderdale, FL, USA	2019, 2018, 2016
PCF Retreat, Carlsbad, CA, USA	2019, 2018
HHMI Meeting, Janelia Farms, Ashburn, VA, USA	2016

**Selected Posters**

Annual Meeting of the RNA Society, (Virtual meeting; Seattle, WA; Madison, WI), USA	2021, 2020, 2010, 2009
Riboclub annual meeting (Virtual), Canada	2020
Keystone Symposia on Bimolecular Condensates, Snowbird, UT, USA	2019
AACR Annual Meeting, Chicago, IL, USA	2018, 2017
Keystone Symposia on Noncoding RNAs, Keystone, CO, USA	2018
Gordon Research Conference – Post transcriptional gene regulation, Newport, RI, USA	2014
CSHL Meeting on Eukaryotic mRNA Processing, Cold Spring Harbor, NY, USA	2013
The Vaughan Symposium (PECRUM), Ann Arbor, MI, USA	2011, 2008
Experimental Biology Conference (ASBMB), New Orleans, LA, USA	2009

**TEACHING AND MENTORSHIP EXPERIENCE****Research Mentor, University of Michigan (29 trainees)**

2007 - Present

*Undergraduate students (10):* Zhang J, Wang R, Patel N, Coleski A, Raskind G, Stoldt M, D'Silva J, Park JI, Doxtader KA and Agostini M; *Graduate students (17):* Rabbani M, Strand E, Siebenaler R, Islam M, Jalihal A, Denies M, Cameron E, Joiner C, Park I, Arthur E, Haynes C, Brumbaugh A, Leslie R, Sripathi K, Krishnan V, Androsavich JA and Marek MS; *Postdoctoral fellow (1):* Narayanan SP; *Technical assistant (1):* Jiang X

**Graduate Student Instructor, University of Michigan**

2006 - 2007

*Lab and lecture:* CHEM 215/216 Organic Chemistry-II, instructed 37 students  
*Lecture:* CHEM 130 General Chemistry, instructed 91 students

**PROFESSIONAL SERVICES**

**Manuscript reviewer:** Nature Methods, Advanced Materials, JoVE, Small, European Urology, Nucleic Acids Research, Nanoscale, Angewandte Chemie, PLoS one, Molecules, International Journal of Molecular Sciences, Medicine, Biomarker Insights, Central European Journal of Biology 2014 - Present

**Grant reviewer:** Prostate Cancer Foundation, Innovation and Technology Support Program (Hong Kong) 2014 - present

**Workshop Coordinator:** Principles of Single Molecule Techniques Workshop, University of Michigan 2015

**Member:** Graduate recruitment activities, Department of Chemistry, University of Michigan 2014 - 2015

**PROFESSIONAL AFFILIATIONS**

**Member:** American Association of Biochemistry and Molecular Biology 2019 - Present

**Member:** American Association for the Advancement of Science 2016 - Present

**Member:** American Association of Cancer Research 2015 - Present

**Member:** Biophysical Society 2012 - Present

**Member:** RNA Society 2009 - Present

## OUTREACH

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**Volunteer:** ACS-Huron Valley Division, Hands-on Chemistry Demo Day, MI, USA

2012

**Volunteer:** ASHA for Education – Non-Profit Organization, Ann Arbor, MI USA

2007 - 2012