Karthik Ramaswamy Padmanabhan

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PROFESSIONAL SUMMARY

- Bioinformatics Expert with 10+ years of experience designing, developing, & deploying NGS analysis pipelines.
- Proven track record of driving cross-functional collaboration, leading complex genomics projects, and delivering impactful tools for R&D and clinical applications.

TECHNICAL SKILLS

NGS Analysis: CNV/SNV detection, ChIP-Seq, (h)MeDIP-Seq, ATAC-Seq, bulk/single-cell RNA-Seq, ONT, scCUT&Tag
Programming & Tools: Python, R, Perl, Bash, R Shiny, Jupyter
Pipeline Development: Nextflow, Snakemake, Docker, Singularity, Git
Cloud & DevOps: AWS (EC2, S3), CI/CD, GitHub, VS Code

BIOINFORMATICS EXPERIENCE

Senior Staff Engineer, Bioinformatics **Apr 2024 - present**
Takara Bio USA *San Jose, CA*
- Architected and led the overhaul of the Cogent suite (DNA/RNA-Seq pipelines) using Nextflow, improving runtime efficiency and reducing pipeline failure rate
- Designed and deployed scalable tools for R&D teams to accelerate new product design cycles, integrating Python, Docker, and Shiny for rapid prototyping

Staff Scientist, Bioinformatics **Jan 2021 - Mar 2024**
Takara Bio USA *San Jose, CA*
- Spearheaded pipeline development and UI implementation for Embgenix PGT-A, enabling reliable aneuploidy detection from low-pass CNV data
- Acted as the bioinformatics liaison for DNA-Seq reproductive health products, delivering insights for clinical assay development

Bioinformatician/Computational Biologist **Sep 2016 - Jan 2021**
University of Michigan *Ann Arbor, MI*
-Independently designed and operationalized robust Snakemake pipelines for high-dimensional genomics experiments (e.g., ChIP-Seq, WGBS, ATAC-Seq) used across multiple projects
- Initiated and led project scoping discussions, guiding PI-level decision-making on analysis plans, tool selection, and budget allocation

Research Assistant **Aug 2012 - Jul 2016**
Purdue University *West Lafayette, IN*
-Led the design and execution of a *de novo* transcriptome analysis project in giant ragweed, uncovering candidate genes linked to herbicide resistance
- Developed and implemented statistical models for protein domain co-occurrence analysis across plant lineages, generating novel evolutionary insights into early land plant diversification

Data Science Intern **May 2015 - Aug 2015**
Monsanto *Chesterfield, MO*
-Built predictive ML models to correlate genetic and metabolite profiles with yield outcomes, identifying top-ranked features that informed product development
- Delivered findings through custom R Shiny dashboards used by cross-state R&D teams

EDUCATION

Ph.D. Biological Sciences (Computational Life Sciences Program) **Jul 2016**
Purdue University *West Lafayette, IN*

M.S. Bioinformatics **Jun 2011**
Indiana University *Bloomington, IN*

B.Tech. Industrial Biotechnology **May 2009**
SASTRA University *Tamil Nadu, India*

PUBLICATIONS AND PATENTS

- J. Meyers, L. Zhao, N. Yasuyama, J. Kim, **K. Padmanabhan**, et al. "Evaluation of Cell-Free Nucleic Acids in Blastocoel Fluid Conditioned Media and its Potential for Non-Invasive Embryo Assessment". *Fertility and Sterility*. 2022 Oct.
- N.K. Patel, J.H. Nunez, M. Sorkin, S. Marini, C.A. Pagani, A.L. Strong, C.D. Hwang, S. Li, **K. Padmanabhan**, et al. "Macrophage TGF-β signaling is critical for wound healing with heterotopic ossification after trauma". *JCI Insight*. 2022 Sep.
- J. Foox, J. Nordlund, C. Lalancette, T. Gong, M. Lacey, S. Lent, B.W. Langhorst, V.K.C. Ponnaluri, L. Williams, **K. Padmanabhan**, et al. "The SEQC2 Epigenomics Quality Control (EpiQC) Study: Comprehensive Characterization of Epigenetic Methods, Reproducibility, and Quantification". *Genome Biology*. 2021 Dec.
- J. Meyers, J. Laliberte, N. Yasuyama, J. Kim, **K. Padmanabhan**, et al. "The Effect of Embryo Morphology and Culturing Methods on the Performance of Non-Invasive Preimplantation Genetic Testing for Aneuploidies". *Fertility and Sterility*. 2021 Sep.
- Z.M. Laubach, J.R. Greenberg, J.W. Turner, T. Montgomery, M.O. Pioon, L. Smale, R. Cavalcante, **K. Padmanabhan**, et al. "Early-life social experience affects offspring DNA methylation and later life stress phenotype". *Nature Communications*. 2021 Jul.
- N.J. Edwards, E. Hobson, D. Dey, A. Rhodes, C. Pagani, A.L. Strong MD, G.E. Hespe, A. Huber, **K. Padmanabhan**, et al. "High Frequency Spectral Ultrasound Imaging Detects Early Stage Post Traumatic Heterotopic Ossification in Rodent Models". *Stem Cells Dev*. 2021 May.
- C.A. Pagani, A.K. Huber, C. Hwang, S. Marini, **K. Padmanabhan**, et al. "Novel Lineage Tracing System to Identify Site-specific Ectopic Bone Progenitor Cells". *Stem Cell Reports*. 2021 Feb.
- P. Venkatraman, I. Mills-Henry, **K. Padmanabhan**, et al. "Rods Contribute to Visual Behavior in Larval Zebrafish". *Investigative Ophthalmology and Visual Science*. 2020 Oct.
- A.K. Huber, N. Patel, C.A. Pagani, S. Marini, **K. Padmanabhan**, et al. "Immobilization after injury alters extracellular matrix and stem cell fate". *The Journal of Clinical Investigation*. 2020 Jul..
- A.K Saha, R. Contreras-Galindo, Y.S. Niknafs, M. Iyer, T. Qin, **K. Padmanabhan**, et al. "The role of the histone H3 variant CENPA in prostate cancer". *Journal of Biological Chemistry*. 2020 May.
- **K. Padmanabhan**, K. Segobye, S.C. Weller, B. Schulz, M. Gribskov. "Preliminary investigation of glyphosate resistance mechanism in giant ragweed using transcriptome analysis". *F1000 Research*. 2016 Jun.
- B. Schulz, S.C. Weller, M. Gribskov, **K. Padmanabhan**, K. Segobye, "Diagnostic Tools for Herbicide Resistance in Weeds", Application No. 61/910,770 ("Technology"), 2013

PRESENTATIONS

- **K. Padmanabhan**, K. Segobye, S.C. Weller, B. Schulz, M. Gribskov, "Transcriptome Analysis of Giant Ragweed", Office of Interdisciplinary Graduate Programs Spring Reception, Purdue University, 2015 (Poster Presentation)
- **K. Padmanabhan**, K. Segobye, M. Gribskov, B. Schulz, S.C. Weller, "Molecular Analysis of Glyphosate Resistance in Giant Ragweed", NCWSS Annual Meeting, Minneapolis, MN, December 3, 2014 (Oral Presentation)
- **K. Padmanabhan**, K. Segobye, M. Gribskov, B. Schulz, S.C. Weller, "Molecular Analysis of Glyphosate Resistance in Giant Ragweed", Graduate Student Retreat, Purdue University, 2014 (Oral Presentation)
- **K. Padmanabhan**, N.B. Best, M. Gribskov, S.C. Weller, B. Schulz, "Transcriptome Analysis of Glyphosate Resistance in Giant Ragweed", Joint Annual Meeting of WSSA and CWSS, Vancouver, BC, February 4, 2014 (Oral Presentation).

SELECTED AWARDS

- Purdue Graduate Student Government Travel Award, Purdue University, 2015
- Purdue Graduate Student Government Professional Award, Purdue University, 2014
- Student Innovator Award, Purdue University, 2014
- Summer Institutes in Statistical Genetics Travel Award, University of Washington, 2014
- Best Oral Presentation, Department of Biological Sciences, Purdue University, 2014
- Dr. P.T. Gilham Graduate Award. Purdue University, 2011

OUTREACH AND LEADERSHIP

- Volunteer Reviewer, PeerJ, 2024 - present
- Associate Editor, Journal of Emerging Investigators, 2024-25
- Assistant Program Coordinator, LSAMP Summer Undergraduate Research Program, 2016
- President/Treasurer/Webmaster, Biological Graduate Student Council, Purdue University, 2012-15
- Organizer/Lead Instructor, Computational Interdisciplinary Graduate Programs RNA-Seq Workshop, 2015
- Webmaster, Society of Industrial and Applied Mathematics, Purdue University, 2012-13
- Teaching Assistant, Purdue University
  - *Introduction to R and Bioconductor, Summer 2014*
  - *Human Anatomy and Physiology Fall 2011 – Spring 2013*