

# Karthik Ram Padmanabhan, Ph.D.

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in karthikrpad

## PROFESSIONAL SUMMARY

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- Bioinformatics Analyst with 10+ years of hands-on experience in development of next-gen sequencing pipelines
- Expert in analysis of high-throughput sequencing data, highly collaborative with excellent communication skills

## TECHNICAL SKILLS

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### Biological Data Analysis

- bulk and scDNA-Seq (CNV and SNV calling, Bisulfite Sequencing, ChIP-Seq, (h)MeDIP-Seq, ATAC-Seq)
- bulk and scRNA-Seq (Expression profiling, de novo transcriptome assembly)

### Languages/Software Development

- R, Python, Perl, Nextflow, AWS, R Shiny, Snakemake, Docker, Singularity, JavaScript, version control (CVS, git), Jupyter Notebook, SDLC best practices
- Machine learning and feature selection (Random forests, Genetic Algorithms, Support Vector Machines),  $\LaTeX$

## BIOINFORMATICS EXPERIENCE

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### Staff Scientist, Bioinformatics

Jan 2021- present

*Takara Bio USA*

*San Jose, CA*

- Led the development and maintenance of Cogent suite of data analysis pipelines for DNA/RNA-Seq data using Nextflow
- Worked on algorithm and UI development for Embgenix PGT-A software for aneuploidy detection (low pass sequencing CNV detection) in embryos
- Collaborated with bench scientists to address bioinformatics needs in DNA-Seq, particularly in reproductive health

### Bioinformatician/Computational Biologist

Sep 2016 - Jan 2021

*University of Michigan*

*Ann Arbor, MI*

- Developed, tested and maintained bioinformatics pipelines using Snakemake, R, Python, and open-source bioinformatics tools
- Worked with scientists to develop analysis plans and budgets for bioinformatics/epigenomics research groups
- Applied computational and statistical tools to interpret results from high dimensional genomics experiments derived from high-throughput sequencing (ChIP-Seq, ERRBS/WGBS, bulk/single-cell ATAC-Seq, RNA-Seq, Exome-Seq)
- Organized pre- and post-analysis consultations, generated detailed analysis reports and interpreted results effectively to non-expert audience

### Research Assistant

Aug 2012 - Jul 2016

*Purdue University*

*West Lafayette, IN*

- Analyzed NGS data (*de novo* transcriptome analysis) from giant ragweed to identify genes responsible for disease resistance
- Performed domain co-occurrence analysis using statistical models for identifying the pairwise probability of protein domains

### Data Science Intern

May 2015 - Aug 2015

*Monsanto*

*Chesterfield, MO*

- Investigated the effect of metabolites and genes on selected yield-related phenotypes in corn using machine learning algorithms and feature selection methods, generated a list of predictive features affecting the yield of corn
- Collaborated with multi-state teams to design and develop web applications in R Shiny, communicated results effectively with non-specialist scientists from other teams

## EDUCATION

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### 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

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- 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- $\beta$  signaling is critical for wound healing with heterotopic ossification after trauma". *JCI Insight*. 2022 Sep. <https://doi.org/10.1172/jci.insight.144925>.
- 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. <https://doi.org/10.1186/s13059-021-02573-y>.
- 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. doi:10.1038/s41467-021-24583-x.
- 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. doi: 10.1089/scd.2021.0011.
- 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. doi: 10.1016/j.stemcr.2021.01.011.
- P. Venkatraman, I. Mills-Henry, **K. Padmanabhan**, et al. "Rods Contribute to Visual Behavior in Larval Zebrafish". *Investigative Ophthalmology and Visual Science*. 2020 Oct. doi:<https://doi.org/10.1167/iovs.61.12.11>
- 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. doi: 10.1172/jci136142.
- 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. doi: 10.1074/jbc.RA119.010080
- **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. doi: 10.12688/f1000research.8932.1
- 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

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- **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

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- 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

## TEACHING AND LEADERSHIP

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- 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