

## Akshay Kakumanu

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CONTACT INFORMATION	424 Waupelani Dr, Apt K-21 State College, PA 16801	540-449-4775 auk262@psu.edu
EDUCATION	<b>Penn State</b> , State College, PA Ph.D., Bioinformatics and Genomics, <i>Expected</i> : Summer 2017 <ul style="list-style-type: none"><li>• Thesis Topic: <i>Computational methods to study TF binding dynamics during cellular programming</i></li><li>• Advisor: Shaun Mahony, Ph.D</li></ul> <b>Virginia Tech</b> , Blacksburg, VA M.S., Virginia Bioinformatics Institute, July 2012 <b>Indian Institute of Technology</b> , Guwahati, India B.Tech., Bioengineering, May 2010	
RESEARCH INTERESTS	<ul style="list-style-type: none"><li>• Applied machine learning in regulatory genomics</li><li>• Method development for:<ul style="list-style-type: none"><li>• Time series TF binding analysis</li><li>• <i>De novo</i> motif discovery</li><li>• Cross celltype TF binding prediction</li></ul></li><li>• Cellular reprogramming</li><li>• Single cell genomics</li><li>• Pipeline development for ChIP-Seq/Exo, RNA-Seq, ATAC-seq data analysis.</li><li>• Systems biology</li></ul>	
RESEARCH EXPERIENCE	<b>Research Assistant</b> Department of Biochemistry and Molecular Biology, Penn State Supervisor: Shaun Mahony, Ph.D <b>Research Assistant</b> Virginia Bioinformatics Institute, Virginia Tech Supervisors: Ruth Grene, Ph.D and Andy Pereira, Ph.D <b>Research Assistant</b> Department of Biosciences and Bioengineering, Indian Institute of Technology, Guwahati Supervisor: Swaminathan Rajaram, PhD.	May 2012 to present Aug 2010 to July 2012 Aug 2008 to May 2010
BIORXIV PRE-PRINTS	1. <b>Kakumanu, A.</b> , Velasco, S., Mazzoni, E. and Mahony, S. “Characterizing regulatory sequence features that discriminate between overlapping annotation labels” <i>BioRxiv</i> , 2017.	
REFEREED JOURNAL PUBLICATIONS	1. Velasco, S.*, Ibrahim, M.M*, <b>Kakumanu, A.*</b> , Garipler, G., Aydin, B., Al-Sayegh, M. A., Hirsekorn, A., Abdul-Rahman, F., Satija, R., Ohler, U., Mahony, S. and Mazzoni, E. “A multi-step transcriptional and chromatin state cascade underlies motor neuron programming from embryonic stem cells.” <i>Cell Stem Cell</i> , 2017. [* Co-first author]. 2. Iwafuchi-Doi, M., Donahue, G., <b>Kakumanu, A.</b> , Watts, J.A., Mahony, S., Pugh, F.B., Lee, D., Kaestner, K.H. and Zaret, K.S. “The pioneer transcription factor FoxA maintains an accessible nucleosome configuration at enhancers for tissue-specific gene activation.” <i>Molecular Cell</i> , 2016.	

3. Mahony, S., Edwards, M.D., Mazzoni, E.O., Sherwood, R.I., **Kakumanu, A.**, Morrison, C.A., Wichterle, H. and Gifford, D.K. “An integrated model of multiple-condition ChIP-Seq data reveals predeterminants of Cdx2 binding.” *PLoS Comp Biol*, 2014.
4. Collakova, E., Aghamirzaie, D., Fang, Y., Klumas, C., Tabataba, F., **Kakumanu, A.**, Myers, E., Heath, L.H. and Grene, R. “Metabolic and transcriptional reprogramming in developing soybean (*Glycine max*) embryos” *Metabolites*, 2014.
5. **Kakumanu, A.\***, Ambavaram, M.M.R\*, Klumas, C., Krishnan, A., Batlang, U., Myers, E., Grene, R. and Pereira, A. “Effects of drought on gene expression in maize reproductive and leaf meristem tissue revealed by RNA-Seq” *Plant Physiology*, 2012. [\* Co-first author].

AWARDS	<ul style="list-style-type: none"> <li>• Graduate research fellowship, Penn State (awarded to top 5% of incoming graduate students) <span style="float: right;">2012-2013</span></li> <li>• Huck institute fellowship, Penn State <span style="float: right;">2012-2013</span></li> <li>• Huck thesis enrichment award, Penn State <span style="float: right;">2015</span></li> <li>• PPWS best poster award, Virginia Tech <span style="float: right;">2012</span></li> </ul>
TALKS AND POSTERS	<ul style="list-style-type: none"> <li>• Global regulation of gene expression, CSHL (poster) <span style="float: right;">Feb 2017</span></li> <li>• Genomics seminar series, Penn State (talk) <span style="float: right;">Apr 2015, Dec 2016</span></li> <li>• CEGR seminar series, Penn State (talk) <span style="float: right;">Mar 2015, Sep 2016</span></li> <li>• RECOMB/ISCB, Regulatory and systems genomics, Philadelphia (poster) <span style="float: right;">Nov 2015</span></li> <li>• Bioinformatics and Genomics retreat, Penn State (poster) <span style="float: right;">Sep 2014, Sep 2015</span></li> <li>• Chromatin and Epigenetic regulation of transcription, Penn State (poster) <span style="float: right;">July 2015</span></li> <li>• Lecture, Introduction to Bioinformatics course, Penn State (talk) <span style="float: right;">Fall 2013</span></li> <li>• PPWS annual poster competition, Virginia Tech (poster) <span style="float: right;">Jan 2012</span></li> <li>• Lecture, Paradigms of Bioinformatics course, Virginia Tech (talk). <span style="float: right;">Fall 2011</span></li> </ul>
TEACHING EXPERIENCE	<p>Teaching Assistant <span style="float: right;">Fall 2011</span>  GBCB 5314 - Paradigms for Bioinformatics  Instructor: Ruth Grene, Ph.D  Virginia Tech</p> <p>Teaching Assistant <span style="float: right;">Fall 2013</span>  BMB497F - Introduction to Bioinformatics  Instructor: Shaun Mahony, Ph.D  Penn State</p>
SERVICE	<p>Lead Organizer, Bioinformatics and genomics retreat <span style="float: right;">2015</span></p> <ul style="list-style-type: none"> <li>• Organized 20 faculty talks and a distinguished keynote lecture.</li> <li>• Designed a data visualization workshop that was attended by nearly 200 people.</li> </ul> <p>Treasurer, GenoMIX club <span style="float: right;">2013-2015</span></p> <ul style="list-style-type: none"> <li>• Assisted in organizing monthly mini-workshops and student socials.</li> <li>• Helped the GenoMIX club in inviting outside speakers.</li> </ul>
SKILLS	<p>Applied Machine Learning</p> <ul style="list-style-type: none"> <li>• Regularized linear and logistic regression methods</li> <li>• Sequence kernels with SVMs for motif discovery</li> <li>• Random forests and other ensemble methods for TF binding prediction</li> <li>• Graphical models for unsupervised clustering of chromatin datasets</li> </ul>

- Convolutional neural networks for TF binding prediction
- Optimization frameworks like ADMM and EM

Programming languages

- Java, Python, Perl, R and  $\text{\LaTeX}$
- Tools/packages: Weka, Apache Spark, Tensorflow, ggplot2, dplyr
- IDE: Eclipse
- Version control: Git

REFERENCES

- Dr. Shaun Mahony  
 Assistant Professor  
 Dept. of Biochemistry and Molecular Biology  
 Penn State  
 Phone: 814-865-3008  
 E-mail: mahony@psu.edu
- Dr. Esteban O. Mazzone  
 Assistant Professor  
 Dept. of Biology  
 New York University  
 Phone: 212-992-9564  
 E-mail: eom204@nyu.edu
- Dr. B. Franklin Pugh  
 Evan Pugh University Professor  
 Dept. Biochemistry and Molecular Biology  
 Penn State  
 Phone: 814-863-8252  
 E-mail: bfp2@psu.edu
- Dr. Ross C. Hardison  
 T. Ming Chu Professor  
 Dept. Biochemistry and Molecular Biology  
 Penn State  
 Phone: 814-863-0113  
 E-mail: rch8@psu.edu