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Curriculum Vitae

RESEARCH INTERESTS

- Analysis of high throughput sequencing data (e.g., ChIP-seq, RNA-seq, MNase-seq and Exome-seq)
- Transcriptional regulation, alternative splicing, nucleosome positioning and epigenetics
- Large scale data integration and systems biology
- Statistical inference and machine learning
- Protein structure prediction

EDUCATION

2009–present • **Postdoctoral Associate** in **Molecular and Human Genetics**
Baylor College of Medicine, Houston, Texas

2004–2009 • **Ph.D.** in **Electrical and Computer Engineering**
The University of Texas, Austin, Texas

2002–2004 • **M.S.** in **Physics**
University of California, San Diego, California

1998–2002 • **B.S.** in **Physics**
Minor in **Economics**
Peking University, Beijing, P. R. China

EXPERIENCE

Research:

2009–Present • **Bioinformatics:**
Developed new methods and pipelines for analyzing microarry data and sequencing data of various types, including RNA-seq, ChIP-seq and MNase-seq.
Discovered MeCP2 high and low affinity genomic binding regions using MeCP2 ChIP-seq data.
Developed a powerful RNA-seq analysis method DASplice.
Discovered the Rbfox1 regulated splicing network in Rett syndrome mouse model.
Discovered alternative splicing events regulated by Nova1 in breast cancer.

2004–2009 • **Computational lithography:**
Developed an accurate transmission cross coefficient (TCC) computation algorithm.
Doubled the speed of the method of optimal coherent approximations (OCAs).
Developed a new lithography model and an OPC algorithm which take care of process variations.
Developed a fast lithography simulator which was applied to a RET-aware router.

2003–2004 • **Low power design:** Proposed a bus encoding scheme for embedded-processor power reduction, which is confirmed by SimpleScalar simulation.

2002–2003 • **Parallel computation:** Implemented parallel latency-tolerant Fast Fourier Transform programs. Investigated their performances on the Blue Horizon supercomputer at San Diego Supercomputer Center and proposed a modified LogGP model to describe the performance.

2001–2002 • **Computational Physics:** Applied Lattice Boltzmann Equation Method to simulate the Jovian Great Red Spot. Simulated Black-eye Pattern Formation, a phenomena in a reaction-diffusion system.

EXPERIENCE (continued)

Internship:

05/2008–08/2008 • **Cadence Research Laboratories, Cadence, Berkeley, CA.** Developing lithography image simulations algorithms based on Abbe's formulation.

05/2006–08/2006 • **IBM Systems & Technology Group, IBM, Fishkill, NY.** Develop metrics, methodology and software code to measure and predict the manufacturability of VLSI designs.

05/2005–08/2005 • **Advanced Technology Group, Synopsys, Mountain View, CA.** Developed a lithography hotspots checker, and used it to check 90nm and 65nm designs. Investigated fast hotspot detection metrics.

Teaching:

2012 • **Computational Mathematics for Biomedical Scientists (GS-SB-401), Baylor College of Medicine** Taught graduate students Bayes and empirical Bayes methods with the application to microarray and sequencing data analysis.

2004–2005 • **EE438 Labs (Electronics lab), University of Texas** Taught undergraduate students how to use PSPICE and LabVIEW to simulate and measure circuits respectively, rated by the students as high as 4.7/5.0.

2003–2004 • **1-series Physics, University of California** Helped undergraduate students do freshman physics experiments interactively.

2003–2004 • **4-series Physics, University of California** Held homework discussion sessions and graded quizzes and finals weekly.

LIST OF PUBLICATIONS

Journal:

2013

- **P Yu**, L Chen, CA Shaw, HZ Zoghbi, "RNA binding protein, fox-1 homolog (Rbfox1) Mediated Alternative Splicing in *MECP2*-related Disorders", under preparation.
- **P Yu**, H Villanueva, AP Visbal, MT Lewis, CA Shaw, "Differential Alternative Splicing Analysis Reveals Nova1-associated Splicing Changes downstream of Activated Smoothened", being prepared for submission to *Nature Methods*.
- LM Franco, KL Bucasas, JM Wells, D Nino, X Wang, GE Zapata, N Arden, **P Yu**, JM Quarles, MS Bray, RB Couch, JW Belmont and CA Shaw, "Integrative Genomic Analysis of the Human Immune Response to Influenza Vaccination", *The eLife Journal*, under review.
- JJ Kahle, GP Souroullas, **P Yu**, F Zohren, Y Lee, CA Shaw, HY Zoghbi, MA Goodell, "Ataxin1L is a regulator of HSC function highlighting the utility of cross-tissue comparisons for gene discovery", *PLOS Genetics*, accepted.
- SA Baker, L Chen, AD Wilkins, **P Yu**, O Lichtarge and HY Zoghbi, "A newly characterized AT-hook domain in MeCP2 determines clinical course of RTT and related disorders", *Cell*, accepted.

2012

- JD Kessler, KT Kahle, T Sun, KL Meerbrey, MR Schlabach, EM Schmitt, SO Skinner, Q Xu, MZ Li, ZC Hartman, M Rao, **P Yu**, R Dominguez-Vidana, AC Liang, NL Solimini, RJ Bernardi, B Yu, T Hsu, I Golding, J Luo, CK Osborne, CJ Creighton, SG Hilsenbeck, R Schiff, CA Shaw, SJ Elledge and TF Westbrook, "A SUMOylation-Dependent Transcriptional Subprogram Is Required for Myc-Driven Tumorigenesis" *Science* 2012, Vol. **335**, no. 6066, pp. 348-353.

2011

- J Fryer, **P Yu**, H Kang, C Mandel-Brehm, AN Carter, J Crespo-Barreto, Y Gao, A Flora, CA Shaw, HT Orr and HY Zoghbi ,"Exercise and Genetic Rescue of SCA1 via the Transcriptional Repressor Capicua," *Science* 2011, Vol. **334**, no. 6056, pp. 690–693.

2009

- **Peng Yu** and David Z. Pan,"ELIAS: An Accurate and Extensible Lithography Aerial Image Simulator with Improved Numerical Algorithms," *IEEE Transactions on Semiconductor Manufacturing, Vol. **22**, no. 2, pp. 276–289, May, 2009.*

2008

- David Z. Pan, **Peng Yu**, Minsik Cho, Anand Ramalingam, Kiwoon Kim, Anand Rajaram and Sean X. Shi, "Design for Manufacturing Meets Advanced Process Control: A Survey," *The Journal of Process Control (JPC)*, Vol. **18**, no. 10, pp. 975-984, December, 2008.
- **Peng Yu**, Weifeng Qiu and David Z. Pan, "Fast Lithography Image Simulation By Exploiting Symmetries in Lithography Systems," *IEEE Transactions on Semiconductor Manufacturing*, Vol. **21**, no. 4, pp. 638–645, November, 2008.

LIST OF PUBLICATIONS (continued)

2007
- **Peng Yu**, Sean X. Shi and David Z. Pan,"True Process Variation Aware Optical Proximity Correction with Variational Lithography Modeling and Model Calibration," *Journal of Micro/Nanolithography, MEMS and MOEMS*, Vol. **6**, no. 3, 031004, July-September 2007, selected for *Virtual Journal of Nanoscale Science & Technology*, September 24, 2007.

Conference:

2008
- **Peng Yu**, Xi Chen, David Z. Pan and Andrew D. Ellington, "Synthetic Biology Design and Analysis: a Case Study of Frequency Entrained Biological Clock," *Proc. IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, November, 2008.
- **Peng Yu**, Xi Chen, David Z. Pan and Andrew D. Ellington, "Synthetic Biology Design and Analysis: a Case Study of Frequency Entrained Biological Clock," *Synthetic Biology 4.0*, October, 2008.
- Shanhu Shen, **Peng Yu** and David Z. Pan, "Enhanced DCT2-based inverse mask synthesis with initial SRAF insertion," *Proc. SPIE Photomask Technology*, October, 2008.

2007
- **Peng Yu**, and David Z. Pan, "TIP-OPC: A New Topological Invariant Paradigm for Pixel Based Optical Proximity Correction," *Proc. ACM/IEEE International Conference on Computer-Aided Design (ICCAD)*, November, 2007.
- **Peng Yu**, and David Z. Pan, "A Novel Intensity Based OPC Algorithm with Speedup in Lithography Simulation," *Proc. ACM/IEEE International Conference on Computer-Aided Design (ICCAD)*, November, 2007.
- **Peng Yu**, and David Z. Pan, "TIP-OPC: A New Topological Invariant Paradigm for Pixel Based Optical Proximity Correction," *Proc. SRC Techcon Conference*, September, 2007.
- **Peng Yu**, David Z. Pan,"Fast Predictive Post-OPC Contact/Via Printability Metric and Validation," *Proc. SPIE Optical Microlithography XX*, San Jose, CA, February 2007.

2006
- Sean X. Shi, **Peng Yu** and David Z. Pan, "A Unified Non-Rectangular Device and Circuit Simulation Model for Timing and Power", *Proc. IEEE/ACM Int'l Conference on Computer-Aided Design (ICCAD)*, November, 2006.
- **Peng Yu**, Sean X. Shi, and David Z. Pan, "Process Variation Aware OPC with Variational Lithography Modeling," *DAC'06: Proceedings of the 43rd Annual Design Automation Conference*, San Fransisco, CA, July 2006.
- **Peng Yu**, David Z. Pan and Chris A. Mack, "Fast Lithography Simulation Under Focus Variations for OPC and Layout," *Proc. SPIE: Design and Process Integration for Microelectronic Manufacturing IV*, San Jose, CA, February 2006.

2005
- Joydeep Mitra, **Peng Yu** and David Z. Pan, "RADAR: RET-Aware Detailed Routing Using Fast Lithography Simulations," *DAC'05: Proc. 42nd Annual Design Automation Conference*, Anaheim, CA, June 2005.
- Joydeep Mitra, **Peng Yu** and David Z. Pan, "RADAR: RET-Aware Detailed Routing", *Electronic Design Process (EDP) Workshop*, Monterey, California, April 2005.

Patent:

2010
- Zhigang Pan and **Peng Yu**, "Method and System for Performing Optical Proximity Correction with Process Variation Considerations", US Patent, 7,711,504.

HONORS

2008
- **William H. Hildebrand Endowed Graduate Fellowship**, the University of Texas at Austin
- **BioBricks Foundation SB4.0 Travel Award**, Synthetic Biology 4.0
- **Inventor Recognition Award**, Semiconductor Research Corporation (SRC)
- **BACUS Photomask Scholarship**, Society of Photographic Instrumentation Engineers (SPIE)
- **11th ACM/SIGDA Ph.D. Forum at DAC Travel Grant**, Association for Computing Machinery (ACM)/ Special Interest Group on Design Automation (SIGDA)

2007
- **IBM PhD Fellowship Nominee**, ECE Department, the University of Texas (only two nominations from the ECE department)

2005
- **DAC Young Student Support Program Award**, Design Automation Conference

2000
- **Brilliance Scholarship**, Peking University

1999
- **Gangsong Scholarship**, Peking University

1998
- **Freshman Scholarship**, Peking University

1997
- **Second Prize**, Chinese Physics Olympiad (CPhO), Chinese Physical Society
- **Top Prize**, CPhO in Henan Province, Chinese Physical Society

HONORS (continued)

1996 • **First Prize**, CPhO in Henan Province, Chinese Physical Society

TECHNICAL SKILLS

Programming languages • AWK, Bash, C, C++, Fortran, Java, JavaScript, MATLAB, Mathematica, PARI/GP, Perl, Python, R
Version control • Git, Mercurial
Build automation • GNU Make, CMake, Makepp, Apache Ant

REFERENCES

- Huda Y. Zoghbi, M.D.
  Director, Jan and Dan Duncan Neurological Research Institute at Texas Children's Hospital
  Marvin Fishman Chair in Pediatric Neurology Research
  Professor, Departments of Pediatrics, Molecular and Human Genetics, Neurology, and Neuroscience, Baylor College of Medicine
  Investigator, Howard Hughes Medical Institute
  Member, Institute of Medicine and National Academy of Sciences
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