

Nishanth Ulhas Nair

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CITIZENSHIP India

RESEARCH INTERESTS I am in general interested in broad area of Computational and Systems Biology. Currently I am studying problems in epigenomics, primarily computational methods for the analysis of histone marks. I am also interested in understanding the role of epigenetic markers for cell differentiation, evolution, gene regulation, and cancer.

EDUCATION **École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland.**

Ph.D. (Computer and Communication Sciences)
Laboratory for Computational Biology and Bioinformatics, School of Computer and Communication Sciences (Sept. 2009 — Aug. 2014)

- Thesis: *Computational studies in epigenomics using histone modification data*
Advisors: Prof. Bernard M.E. Moret and Dr. Philipp Bucher
Area of Study: Computational Biology

Indian Institute of Science (IISc), Bangalore, India.

Master of Science (Engineering)
Department of Electrical Communication Engineering (ECE), (Jan. 2006 — Jan. 2009)

- Thesis: *Joint Evaluation of Multiple Speech Patterns for Speech Recognition and Training*
Advisor: Prof. T.V. Sreenivas
Areas of Study: Automatic Speech Recognition and Signal Processing
Awarded best thesis medal

B.M.S. College of Engineering, Bangalore. Visveswaraiah Technological University, Belgaum, India.

Bachelor of Engineering (Electronics and Communication)
Department of Electronics and Communication Engineering, (Aug. 2001 — June 2005)
First Class with Distinction

EXPERIENCE **WORK EXPERIENCE**

- Postdoctoral Research Associate, Hannenhalli Lab, University of Maryland Institute for Advanced Computer Studies (UMIACS), University of Maryland, College Park (May 2015 — present).
Mentor: Prof. Sridhar Hannenhalli
- Postdoctoral Researcher, Laboratory of Computational Biology and Bioinformatics, EPFL (Sept. 2014 — April 2015).
Mentor: Prof. Bernard M.E. Moret.
- Doctoral Assistant, Laboratory of Computational Biology and Bioinformatics, EPFL (Sept. 2009 — Aug. 2014).

- Consultant, Microsoft Research India (MSRI) — officially with Spectrum Consultants India Pvt. Ltd. (Aug. 2008 — Aug. 2009)
 Joint project with the Bioinformatics Group in IISc, Bangalore.
 Research Area: Systems Biology
 Advisors: Dr. Navin Goyal and Prof. Nagasuma R. Chandra
- Taught one month graduate course “Short Course on Automatic Speech Recognition” at IISc, 2008. Teaching capabilities was rated at 3.4 / 5.0 by the students.
- Software engineer, Tata Consultancy India Private Limited (2005).

TRAINING

PROFESSIONAL TRAINING AND ADDITIONAL COURSES

- Did course “Machine learning for bioinformatics and computational biology”, Swiss Institute of Bioinformatics, 23 — 27 Feb. 2015, Lausanne, Switzerland.
- Attended “Mathematical and Computational Approaches in High Throughput Genomics,” a semester long program by Institute of Pure and Applied Mathematics, University of California Los Angeles (Sept. 2011 — Dec. 2011).
- Attended IEEE Signal Processing Society organized Summer School in Automatic Speech Recognition, 2 weeks program in 2007.
- Intern, Indian Institute of Astrophysics, Bangalore, in 2004 — 2005 for 6 months.
 Helped in designing a radioastronomy telescope to capture the outer radiations of the sun.

PUBLICATIONS Peer Reviewed Journal Papers

1. **N.U. Nair**, Y. Lin, A. Manasovska, J. Antic, P. Grnarova, A.D. Sahu, P. Bucher, and B.M.E. Moret, “Study of cell differentiation by phylogenetic analysis using histone modification data,” *BMC Bioinformatics*, 15:269, 2014.
2. **N.U. Nair**, S. Kumar, B.M.E. Moret, and P. Bucher, “Probabilistic partitioning methods to find significant patterns in ChIP-Seq data,” *Bioinformatics*, btu318, 2014.
3. **N.U. Nair***, A.D. Sahu*, P. Bucher, and B.M.E. Moret, “ChIPnorm: a statistical method for normalizing and identifying differential regions in histone modification ChIP-seq libraries,” *PLoS ONE* 7(8):e39573, 2012 (* contributed equally).
4. J.A. Brusslan, A.M.R. Alvarez-Canterbury, **N.U. Nair**, J.C. Rice, M.J. Hitchler, M. Pellegrini, “Genome-wide evaluation of histone methylation changes associated with leaf senescence in Arabidopsis,” *PLoS ONE* 7(3):e33151, 2012.
5. **N.U. Nair** and T.V. Sreenivas, “Multi-Pattern Viterbi Algorithm for Joint Decoding of Multiple Speech Patterns,” *Signal Processing*, Dec. 2010 (invited paper based on the EUSIPCO 2008 paper).
6. **N.U. Nair** and T.V. Sreenivas, “Joint Evaluation of Multiple Speech Patterns for Speech Recognition and Training,” *Computer Speech and Language*, 24, 307340, 2010.

Peer Reviewed Conference Proceedings Papers

1. **N.U. Nair**, Y. Lin, P. Bucher, and B.M.E. Moret, “Phylogenetic analysis of cell types using histone modifications,” *Proc. 13th Workshop on Algorithms in Bioinformatics WABI’13*, in *Lecture Notes in Computer Science* 8126, 326337, Springer Verlag, 2013.

2. **N.U. Nair**, N. Goyal, N.R. Chandra, “Enhanced flux balance analysis to model metabolic networks,” ACM International Conference On Bioinformatics and Computational Biology (ACM-BCB), 2010.
3. **N.U. Nair** and T.V. Sreenivas, “Viterbi Algorithm for Multi-Pattern Joint Decoding,” IEEE TENCON 2009.
4. D. Bansal, **N. Nair**, R. Singh, B. Raj, “A Joint Decoding Algorithm for Multiple-Example-Based Addition of Words to a Pronunciation Lexicon,” IEEE International Conference of Acoustics, Speech, and Signal Processing (ICASSP), 2009.
5. **N.U. Nair** and T.V. Sreenivas, “Multi Pattern Dynamic Time Warping for Automatic Speech Recognition,” IEEE TENCON, 2008.
6. **N.U. Nair** and T.V. Sreenivas, “Forward/Backward Algorithms for Joint Multi Pattern Speech Recognition,” European Signal Processing Conference (EUSIPCO), 2008. (rated as one of the best papers in the conference and we got an invite to write a journal paper in EURASIP Journal Signal Processing.)
7. **N.U. Nair** and T.V. Sreenivas, “Joint Decoding of Multiple Speech Patterns for Robust Speech Recognition,” IEEE Workshop on Automatic Speech Recognition and Understanding (IEEE ASRU), December, 2007.

Book Chapters

1. **N.U. Nair** and T.V. Sreenivas, Algorithms for Joint Evaluation of Multiple Speech Patterns for Automatic Speech Recognition, invited chapter (invited based on our IEEE ASRU 2007 paper) in the book Speech Recognition: Technologies and Applications, ISBN 9789537619299, InTeh, Nov. 2008.

Patents

1. **N.U. Nair** and T.V. Sreenivas, System and Method of Using Multi Pattern Viterbi Algorithm for Joint Decoding of Multiple Patterns, Indian patent (No. 02870/CHE/2009), EP patent 2,502,226, WO patent 2,011,061,636, and US patent (No. 12/652,608).

Technical Articles

1. **N.U. Nair**, Manjunath K., M.M. Alam, “Microcontroller-Based Infrared Tracking Robot,” Electronics For You magazine, April 2007.

ACADEMIC HONOURS

- Prof. F.M. Mowdawalla Medal for best Masters thesis award in the ECE department at Indian Institute of Science for the academic year 2008 — 2009.
- Certificate of Appreciation for exemplary work as teaching assistant, 2012 (courses as TA: Statistical Signal Processing and Applications, Spring 2012; Advanced Algorithms, Fall 2012)
- Received Swiss National Science Foundation funding for PhD work for 3 years (2009 — 2012) .
- Awarded second prize in project work at the IEEE Signal Processing Society organized Summer School in Automatic Speech Recognition.
- EUSIPCO 2008 conference paper rated as one of the best in the EUSIPCO conference. Invited to write a journal paper in EURASIP Journal Signal Processing.
- Invited to write book chapters in Speech Recognition.
- Erdős number 3.

RELEVANT COURSE WORK **PhD (EPFL)**
Advanced Algorithms, Cell Biology and Biochemistry for Engineers, Machine Learning, Computational Molecular Biology, Applied Stochastic Processes, Cancer Biology-1, Advanced Analysis-1, Genomics and network architecture, Principles and applications of systems biology.

MSc (Engg.) (IISc)
Random Processes, Automatic Speech recognition and Algorithms, Adaptive Signal Processing, Linear and Nonlinear Time Series Analysis, Speech Information Processing, Multimedia Systems.

Undergraduate
Neural Networks, Digital Signal Processing, Mathematics - 1, 2, 3, 4, Digital Communication, Control Systems, Signals and Systems, C programming language, Object Oriented Programming (C++), Data Structures, Microprocessors and Microcontrollers, Embedded Systems.

PROGRAMMING SKILLS C, R, Python, Perl, MATLAB; also had some exposure to Assembly Language, C++, BASIC, and PASCAL. Platforms used: Linux, Windows

TEACHING & REVIEWING EXPERIENCES **Teaching experiences**
Teaching assistant for Advanced Algorithms, Computational Molecular Biology, Statistical Signal Processing and Applications. Taught one month graduate course “Short Course on Automatic Speech Recognition” at IISc.

Reviewing experiences
Reviewer for RECOMB 2012, IEEE Journal of Biomedical and Health Informatics.

Students mentored

- Ana Manasovska (intern at EPFL), Bachelor’s student at Faculty of Computer Science and Engineering (FCSE), Saints Cyril and Methodius University of Skopje, Skopje, Macedonia. (June — Aug. 2013)
- Paulina Grnarova, Master’s student, School of Computer and Communication Sciences, EPFL, Switzerland. (Sept. 2013 — Aug. 2014)
- Jelena Antic, Master’s student, School of Computer and Communication Sciences, EPFL, Switzerland. (Feb. 2013 — June 2014)
- Laura Hunter (intern at EPFL), Master’s student, Computer Science, Stanford University, USA. (June — Aug. 2014)
- Florian Borse, Master’s student, School of Life Sciences and Technologies, EPFL, Switzerland. (Sept. — Dec. 2014)
- Ana Manasovska, Master’s student, School of Computer and Communication Sciences, EPFL, Switzerland. (Sept. 2014 — Jan. 2015)

OTHER ACTIVITIES Vice President and core team member of YUVA-Indians@EPFL/UNIL, the official Indian student association of EPFL (January 2013 — February 2014).