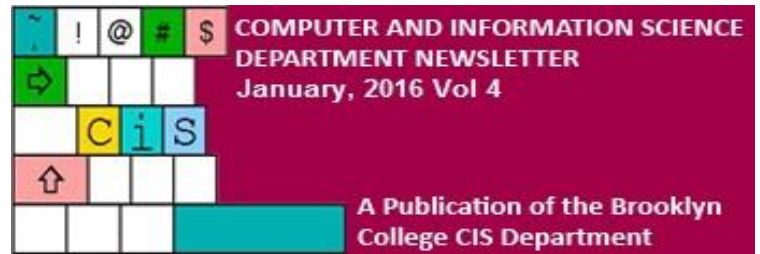




Brooklyn College The City University of New York



Welcome to the Fourth Volume of the Brooklyn College Computer and Information Science Department Newsletter. This issue focuses on would three young new faculty members who we would like to welcome and introduce: Rivka Levitan, Michael Mandel, and Devorah Kletenik. We summarize their work and that of other members of the Department. This Newsletter presents activities that primarily have taken place between June 2014 and August 2015.

Michael Mandel



Michael I. Mandel is a new Assistant Professor of Computer and Information Science at Brooklyn College (CUNY) working in a field called "machine listening" which lies at the intersection of machine learning, signal processing,

and psychoacoustics. He earned his BSc in Computer Science from the Massachusetts Institute of Technology in 2004 and his MS and PhD with distinction in Electrical Engineering from Columbia University in 2006 and 2010 as a Fu Foundation School of Engineering and Applied Sciences Presidential Scholar. From 2009 to 2010 he was an FQRNT Postdoctoral Research Fellow in the Machine Learning Laboratory at the Université de Montréal. From 2010 to 2012 he was an Algorithm Developer at Audience Inc, a company that has shipped over 350 million noise suppression chips for cell phones. From 2012 to 2015 he was a Research Scientist in Computer Science and Engineering at the Ohio State University, where his work was funded by the National Science Foundation and Google.

The field of machine listening aims to create computers than can understand sound as well as human listeners can. Research typically focuses on a single type of sound at a time, such as speech, music, or environmental sounds (everything else). Prof. Mandel has mainly focused on speech and music to date, but would like to include environmental sounds soon. This work has applications in the development of hearing aids, mobile phones, and automatic speech recognition systems and in the analysis of audio archives generated by users (e.g., YouTube) and professionals (e.g., broadcast archives and source material).

Human listeners are currently much better at understanding these sounds than machines are. This is especially true in noisy conditions, and when talkers speak with an accent or in a casual manner. I believe that this advantage comes from the human abilities to identify what is important in the audio signal, and to adapt to the context in which an audio signal was recorded.

In order to make computers better at understanding sound, then, we should make them better able to identify what is important and to recognize and adapt to different listening contexts, including the talker, the room, and other simultaneous sounds sources. Prof.

Mandel's past work has focused on improving robustness to room characteristics and other simultaneous sound sources when heard through two ears (or microphones), and he is currently working on similar issues on the much more difficult, but more common, condition of single channel recordings. In this case, it is necessary to bring additional knowledge to bear on the problem, so his work has focused on utilizing speech synthesis models as this additional knowledge. The focus of this work is then on fitting these complex models to an observation, and initial results have shown improvements in automatic speech recognition and speech enhancement performance.

Devorah Kletenik



Devorah Kletenik is a native Brooklynite. She received her B.S. in CS from Touro College, and her M.S. and Ph.D. from the NYU School of Engineering, where she also completed a postdoc and served as teaching faculty. She is interested

in theoretical problems in CS that are motivated by practical machine learning problems; her research interests include algorithms, Boolean functions, and computational learning theory. Her paper "Discrete Stochastic Submodular Maximization: Adaptive vs. Non-Adaptive vs. Online" appeared in International Conference on Algorithms and Complexity (CIAC) last May, and her paper "Evaluation of Monotone DNF Formulas" was recently accepted by Algorithmica.

Rivka Levitan



Rivka Levitan's research involves spoken language processing, discourse and human computer interaction. Her thesis focused on modeling prosodic entrainment in interactive voice response systems. She has presented her work at prestigious

international conferences including ACL, NAACL, Interspeech and Speech Prosody, and has earned two Best Paper Awards. She has worked as a postdoc with the Spoken Language Processing Group at Columbia University and joined the Department of Computer and Information Science as an Assistant Professor in Spring 2015. Professor Levitan gave a talk at Columbia University as part of their IGERT Distinguished Speaker series, entitled "Does 'women's language' exist? Bringing data to sociolinguistics." The paper can be found at:

http://www.cs.columbia.edu/speech/PaperFiles/2015/sigdial_crosslinguistic_camera_ready.pdf

Her papers "Acoustic-prosodic entrainment in Slovak, Spanish, English and Chinese: A cross-linguistic comparison" and "Backward mimicry and forward influence in prosodic contour choice in Standard American English", were presented at Interspeech (Dresden) and SIGDIAL (Prague) respectively can be found at:

http://www.cs.columbia.edu/speech/PaperFiles/2015/entrain_interspeech.pdf

Professor Levitan Notes: Undergraduate Monika Ciecka and I were awarded some funding from the CRA's CREU program, whose objective is to increase the number of women and members of underrepresented groups involved in research in CS, for the research project she is working on under my supervision.

* I have developed and introduced a new course at the CUNY Graduate Center called "Natural Language Processing and Psychology", whose goal is to introduce students to areas of research at the intersection of the two disciplines, and to ways in which each field can enrich the other. The course ran Fall 2015 with full enrollment, including two students from Columbia.

Distinguished Professor Rohit Parikh

Ph.D. Students Graduated

Loes Olde Loohuis (CUNY 2014)

Yang Liu (Columbia, 2015. Parikh was second adviser).

Cagil Tasdemir (CUNY 2015. Parikh was second adviser. Also published three joint papers with her)

Invited Talks Given

Asian Logic Conference – Mumbai, January 2015.

Conference in Logic, Methodology and Philosophy of Science, Helsinki, August 2015.

Two talks given at the Ludwig Maximilian University, Munich, October 2015.

One talk given at the Epistemology Workshop, Rutgers, September 2015.

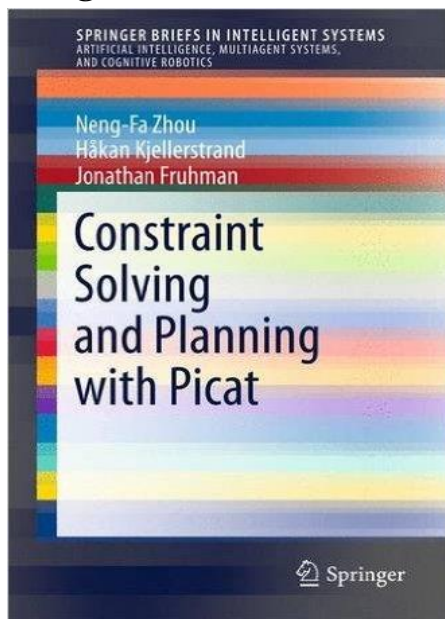
One joint paper with Yunqi Xue in Studies in Logic.

Other Activities:

Co-organized (with Stephen Neale) a workshop on Relevance Games and Communication at the Graduate Center, October 2014.

Ran Seminar in Logic and Games at the Graduate Center.

Neng-Fa Zhou



Book:

N.-F. Zhou, H. Kjellerstrand, and J. Fruhman: Constraint Solving and Planning with Picat, Springer, 2015

Papers:

R. Bartak, A. Dovier, and N.-F. Zhou: On Modeling Planning Problems in Tabled Logic Programming, PPDP 2015.

N.-F. Zhou, R. Bartak, and A. Dovier: Planning as Tabled Logic Programming, TPLP 2015.

N.-F. Zhou, H. Kjellerstrand: The Picat-SAT Compiler, PADL 2016.

Program Committees:

IJCAP'16, AAAI'16, FLOPS'16, PADL'16, ICLP'15, PADL'15

Noson Yanofsky

Prof. Yanofsky continues to explore research in the areas of reasoning, computing, physics and paradoxes. Last year he published his book “The Outer Limits of Reason.” In the Fall he gave a well-received talk entitled “Why Mathematics Works So Well.” He also was a fourth place winner in the FQXi 2015 essay contest “Trick or Truth: the Mysterious Connection Between Physics and Mathematics.”

<http://fqxi.org/community/essay/winners/2015.1#Yanofsky>

In addition, Prof. Yanofsky has published the following:

- Accepted for publication as a chapter in a book. “Resolving Paradoxes” Philosophy Now, Feb/Mar 2015
https://philosophynow.org/issues/106/Resolving_Paradoxes
- “Computability and Complexity of Categorical Structures.” <http://arxiv.org/abs/1507.05305> “The Roll of Symmetry in Mathematics” Joint work with Mark Zelcer. <http://arxiv.org/abs/1502.07803>
- “Galois Theory of Algorithms” <http://arxiv.org/abs/1011.0014> To be published in *Robit Parikh on Logic, Language and Society* Edited by C. Başkent, L. Moss and R. Ramanujam.
- “Kolmogorov Complexity of Categories” <http://arxiv.org/abs/1306.2675> In *Computation, Logic, Games, and Quantum Foundations - The Many Facets of Samson Abramsky* Edited by Bob Coecke, Luke Ong, Prakash Panangaden. Springer LNCS 7860 2013.

Last but not least congratulations on a new edition to the Yanofsky family: Miriam.

Dina Sokol

Publication:

S. Marcus and D. Sokol. 2D Lyndon Words and Applications. Algorithmica, 2015 10.1007/s00453-015-0065-z

Grant:

United States – Israel Binational Science Foundation (BSF) Grant Title: Issues in Combinatorial Pattern Matching - Approximate Cycles and Repeats
amount: \$129,600

From The Abstract

Searching for repeated patterns, periodicities, symmetries, cadences, and other similar forms or unusual patterns in objects is a recurrent task in the compression of data, symbolic dynamics, genome studies, intrusion detection, and countless other activities. This proposal aims at formalizing some aspects of discovery in strings. In particular we are interested in discovering approximate cycles and repeats. The concept of approximation, in the string discovery context, will be considered from a number of orthogonal dimensions, including different error types and distance metrics.

Principal Investigators:

Amihood Amir, Bar Ilan University
Alberto Apostolico, Georgia Institute of Technology
Gad Landau, University of Haifa
Dina Sokol, CUNY, Brooklyn College

Paula Whitlock

A former PhD student at the Graduate Center, Jie Li, is now a faculty member in the Computer Science Department at SUNY at Farmingdale.

Activities

In July, Paula Whitlock was an organizer and session chairperson at the 10th IMACS Seminar on Monte Carlo Methods.

Paula also presented a lecture entitled "Efficient Deterministic and Non-Deterministic Pseudorandom

Number Generation" (with Jie Li and Jianliang Zheng), at the 10th IMACS Seminar on Monte Carlo Methods, Johannes Kepler University, Linz, Austria, July 6-10, 2015.

Gavriel Yarmish

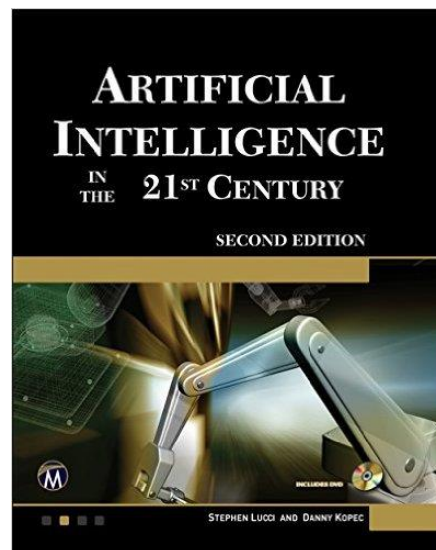
- "Parallel Clustering of Protein Structures Generated via Stochastic Monte Carlo" will be published and presented in February. This paper comes from the collaboration with Simon Dexter a Master's student. He has completed all graduation requirements including acceptance of his master's thesis.
- CS Department Colloquium Talk March 12, 2015: A Distributed Algorithm for Hierarchical Clustering.
- Reviewer for *Journal of Supercomputing* and *Inform Journal on Computing*

Jim Cox

A co-authored paper "Random walks on graphs and Monte Carlo methods" will appear in a special issue of "Mathematics and Computers in Simulation."

Paula Whitlock and Wen-Ju Cheng are the co-authors. Prof. Cox had two Ph.D. students successfully defend their theses during this past year.

Danny Kopec



The second edition of Stephen Lucci's and Danny Kopec's textbook on Artificial Intelligence (615pp.) was published in December, 2015. The text, published by Mercury Learning Inc. of Dulles, Virginia now includes 17

Chapters, including a new Chapter (10) on Machine Learning (using ID3), and a Chapter (15) on Robotics. A number of new exercises have been added along with revisions where appropriate.

Professor Kopec is presently working on completing a new book entitled “Artificial Intelligence and Problem Solving” which is to appear in May, 2016. This book is an offshoot of his 2014 book “Artificial Intelligence Problems and Their Solutions” (Kopec, Shetty and Pileggi). The new book includes an addendum set of Chapters on Problems Requiring Computer Solutions with new Chapters on Sudoku, The Graph Coloring Problem, and Cryptography all contributed by a new author, David Ungar, who is graduating from Brooklyn College with a degree in Physics and Mathematics. A fourth Chapter on Random Walks and Graphs is being contributed by James Cox, based on the aforementioned paper co-authored with Paula Whitlock and Wen-Ju Cheng.

News

Through a Student Tech Fee grant, the Metis cluster has recently been upgraded. The new cluster includes 6 10-core workstations, all with Nvidia GPUs, on a Gigabit network. The Metis cluster, which is maintained by students, is available for use by interested CIS students and their faculty mentors. All software and hardware installation during the Fall, 2015 semester was done by students in CISC 4900 or as volunteers. Current software includes a complete C/C++ toolchain with Open MPI for parallel multiprocessing and distributed processing. In addition to C/C++, the Linux operating system currently supports Python and Scheme, as well as Cobol, to provide students with experience with a language still used commercially. Planned for this spring is implementation of a System Z (IBM mainframe) simulator, together with a VM-370 system, which can provide students familiarity with another operating system. The VM-370 system is expected to support Fortran, PL/I, and Cobol, in addition to a complete set of system utilities. Students and faculty interested in using the cluster should contact Murray Gross or Paula Whitlock. Requests for additional software installation are usually, cheerfully accommodated.

We would like to thank Cynthia Kerr for her service to Department through December 2015 for the past few years, and wish her happiness.

In addition we would like to thank Audrey Williams for her eight years of service to the Department. We look forward to hear good things from the next chapter of her life.

We welcome back Elena Hintze to her position as College Assistant - Graduate.

Note: All information presented here was conveyed by our colleagues and the Newsletter Editors cannot take responsibility for verifying its accuracy.

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