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EDUCATION:

Ph.D., May 2007, Bogazici University, Department of Electrical and Electronic Engineering, Istanbul, Turkey.

Thesis Title: Sequential Bayesian Modeling of Non-Stationary Non-Gaussian Processes.

RESEARCH INTERESTS:

Bayesian Data Analysis and Signal Processing with applications in Earth and Space Sciences, Statistical Signal Processing, Source Separation, Astrophysics, Astrobiology, Spectral Analysis, Alpha Stable Distributions.

PROFESSIONAL EXPERIENCE:

May 2007- present: Senior Research Support Specialist at the Department of Physics, University at Albany, State University of New York, Albany, New York, U.S.A.

2000 – 2007: Research and Teaching Assistant at the Department of Electrical and Electronic Engineering, Bogazici University, Istanbul, Turkey

09/2003 , 02-07/2004 Research Assistant at Consiglio Nazionale delle Ricerche (CNR), Istituto di Scienza e Tecnologie dell' Informazione "A. Faedo", Pisa, Italy

Summer 1996 Intern at NCR Corporation (Formerly AT&T), Istanbul, Turkey

MEMBERSHIPS:

- 2008-present International Society for Bayesian Analysis (ISBA)
- 2008-present American Geophysical Union (AGU)
- 1999-present The Institute of Electrical and Electronics Engineers (IEEE)
- 2005 The European Association for Signal and Image Processing (EURASIP)

AWARDS:

NATO-TUBITAK A2 Research Fellowship in Consiglio Nazionale delle Ricerche (CNR), Istituto di Scienza e Tecnologie dell' Informazione "A. Faedo", Pisa, Italy, between February-July 2004;

Best Student Paper Award, 13th IEEE Conference on Signal Processing and Communications Applications (IEEE-SIU 2005), Kayseri, Turkey, May 2005.

PROFESSIONAL ACTIVITIES:

- 2005 Reviewer for the 13th European Signal Processing Conference (EUSIPCO 2005), Antalya, Turkey, Sept. 2005.
- 2006 Reviewer for the 14th European Signal Processing Conference (EUSIPCO 2006), Florence, Italy, Sept. 2006.
- 2006 Reviewer for the 2006 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2006), Toulouse, France, May 2006.
- 2007 Reviewer for the 15th European Signal Processing Conference (EUSIPCO 2007), Poznań, Poland, Sept 2007.
- 2007 Reviewer for the 27th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering (MaxEnt 2007), Saratoga Springs NY, USA, July 2007.

Conference Organization

Local organizer for the 27th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering (MaxEnt 2007), Saratoga Springs NY, USA, July 2007.

Journal Reviewing

IEEE Transactions on Signal Processing

IEEE Transactions on Image Processing

IEE Proceedings-Vision, Image and Signal Processing

PROJECTS:

1. Senior Research Support Specialist in “Bayesian Source Separation for Astrophysical Spectra: Application to PAHs” funded by NASA AISRP (PI: Kevin Knuth)

Project Description: Complex organic molecules, known as Polycyclic Aromatic Hydrocarbons (PAHs), are widely observed in star-forming regions in interstellar space. To identify and classify PAHs, we are developing and applying new Bayesian source separation techniques to the infrared spectra recorded by the Infrared Space Observatory and the Spitzer Space Telescope.

2. Senior Research Support Specialist in “Identifying relationships among Earth climate data” funded by two NASA grants, (PI William B. Rossow, and PI Kevin H. Knuth)

Project Description: In climate studies, identifying the relevant variables responsible for a phenomenon of interest is a highly challenging problem. To quantify the interactions between different relevant variables, we develop new Bayesian techniques where we estimate entropy and mutual information from data along with their error bars. We demonstrate these techniques on data taken from the International Satellite Cloud Climatology Project (ISCCP).

3. Research assistant in “Applications of Independent Component Analysis in Communications, Image Processing and Geophysics” funded by TUBITAK-CNR between 2002-2004 and 2006-2007

Project Description: Earthquakes, tsunamis and hurricanes are examples of impulsive phenomena which may cause major disruptions. We develop a new Bayesian method to model time-varying impulsive signals and demonstrate this on seismic data taken from the Southern California Seismic Network Catalog.

PhD THESIS:

D. Gencaga, “Sequential Bayesian modeling of non-stationary non-Gaussian processes”, Department of Electrical and Electronic Engineering, Bogazici University, Istanbul, Turkey, 2007.

PUBLICATIONS:

1. D. Gencaga, E. E. Kuruoglu, A. Ertuzun, "Modeling non-Gaussian time-varying vector autoregressive processes by particle filtering", accepted to be published in *Multidimensional Systems and Signal Processing*.
2. D. Gencaga, E. E. Kuruoglu, A. Ertuzun and S. Yildirim, "Estimation of Time Varying Autoregressive Symmetric Alpha Stable Processes using Gibbs Sampling", *Signal Processing*, Vol. 88, Issue 10, pp. 2564-2572, October 2008.
3. D. Gencaga, A. Ertuzun, E.E. Kuruoglu, "Modeling of non-stationary autoregressive alpha-stable processes by particle filters", *Digital Signal Processing*, Vol. 18, Issue 3, pp. 465-478, May 2008.
4. D. Gencaga, D. F. Carbon, K. H. Knuth, "Characterization of Interstellar Organic Molecules," *28th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering, São Paulo, Brazil, 2008*, AIP Conference Proceedings , American Institute of Physics, Melville NY.
5. K. H. Knuth, D. Gencaga, W. B. Rossow, "Information-Theoretic Methods for Identifying Relationships among Climate Variables", *Earth-Sun Systems Technology Conference (ESTC 2008)*, Adelphi MD, June 2008.
6. D. Gencaga, E. E. Kuruoglu, A. Ertuzun, "Estimation of Time-Varying Autoregressive Symmetric Alpha Stable Processes by Particle Filters", Technical Report, 2006-TR-04, ISTI-CNR, 2006.
7. D. Gencaga, E.E. Kuruoglu and A. Ertuzun, "SAR Image Enhancement using Particle Filters", *ESA-EUSC 2005: Image Information Mining – Theory and Application to Earth Observation*, Frascati, Italy, October 2005.
8. D. Gencaga and A. Ertuzun, "On The Performance Comparison of Gradient Type Joint-Process Estimators in Adaptive Signal Processing", *13th European Signal Processing Conference (EUSIPCO 2005)*, Antalya, Turkey, September 2005.
9. D. Gencaga, E.E. Kuruoglu and A. Ertuzun, "Estimation of Time-Varying Autoregressive Symmetric Alpha Stable Processes by Particle Filters", *13th European Signal Processing Conference (EUSIPCO 2005)*, Antalya, Turkey, September 2005.
10. D. Gencaga, E.E. Kuruoglu and A. Ertuzun, "Bayesian Separation of Non-Stationary Mixtures of Dependent Gaussian Sources", *25th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering (MaxEnt 2005)*, San Jose, CA, USA, August 2005.
11. D. Gencaga, E.E. Kuruoglu and A. Ertuzun, "Time-varying autoregressive parameter estimation of Cauchy processes by particle filters" (English), "Zamanla Degisen

Ozbaglanimli Cauchy Sureclerinin Parcacik Suzgecleri ile Kestirimi” (Turkish), *13th IEEE Signal Processing and Communications Applications Conference (IEEE-SIU 2005)*, Kayseri, Turkey, May 2005. (**IEEE Best Student Paper Award**)

12. D. Gencaga and A. Ertuzun, “Online Independent Component Analysis” (English), “Cevrimici Bagimsiz Bilesen Ayristirilmesi”, *11th Signal Processing and Communications Applications Conference*, Istanbul, Turkey, June 2003.

13. D. Gencaga, L. M. Arslan and A. Ertuzun, “Real-time Formant Frequency Estimator for Speech Signals” (English), “Konusma Isaretleri icin Gercek Zamanli Bir Formant Frekans Kestiricisi”, *10th Signal Processing and Communications Applications Conference*, Pamukkale, Denizli, Turkey, June 2002.

14. D. Gencaga and A. Ertuzun, “Adaptive Escalator Filter for System Identification” (English), “Sistem Belirlenmesi icin Merdiven Tipi Uyarlanir Suzgec Yapisi”, *10th Signal Processing and Communications Applications Conference*, Pamukkale, Denizli, Turkey, June 2002.

15. D. Gencaga and A. Ertuzun, “Adaptive Escalator Filter for Acoustic Echo Cancellation” (English), “Akustik Yanki Giderimi icin Merdiven Tipi Uyarlanir Suzgec Yapisi”, *10th Signal Processing and Communications Applications Conference*, Pamukkale, Denizli, Turkey, June 2002.

ABSTRACTS:

1. D. Gencaga, M. K. Tse, W. B. Rossow, K. Knuth, “Estimating Entropies and Mutual Information with Error Bars”, *9th World Conference of the International Society for Bayesian Analysis (ISBA 2008)*, Hamilton Island, Australia, July 21-25, 2008.

2. D. Gencaga, D. F. Carbon, K. H. Knuth, “Characterization of Interstellar Organic Molecules”, *28th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering, (MaxEnt 2008)*, São Paulo, Brazil, July 6-11, 2008.

3. K. H. Knuth, D. Gencaga, D. F. Carbon, “Searching for Complex Organic Molecules in Space”, *NASA Applied Information Systems Research Program Workshop*, Adelphi MD, May 2008.

PRESENTATIONS:

1. D. Gencaga, “Identification of Relevant Climate Variables using Information-Theoretic Approaches”, October 31, 2008, NASA Jet Propulsion Laboratory, Pasadena, California, USA (**Invited Talk**)

2. D. Gencaga, “Alpha Stable Processes and their Application to Seismic Data Modeling”, November 9, 2007, Department of Physics, University at Albany, Albany, NY, USA (**Invited Talk**)

3. D. Gencaga, "Dependent Component Analysis of Non-Stationary Gaussian Signals", October 11, 2005, Consiglio Nazionale delle Ricerche (CNR), Istituto di Scienza e Tecnologie dell' Informazione "A. Faedo", Pisa, Italy (**Invited Talk**)
4. D. Gencaga, "Sequential Bayesian Modeling of Non-Stationary Non-Gaussian Processes", January 23, 2007, Department of Electrical and Electronic Engineering, Bogazici University, Istanbul, Turkey (**PhD Thesis Defense**)
5. D. Gencaga, "Estimating Entropies and Mutual Information with Error Bars", *9th World Conference of the International Society for Bayesian Analysis (ISBA 2008)*, Hamilton Island, Australia, July 21-25, 2008.
6. D. Gencaga, "Characterization of Interstellar Organic Molecules", *28th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering, (MaxEnt 2008)*, São Paulo, Brazil, July 6-11, 2008.
7. D. Gencaga, "SAR Image Enhancement using Particle Filters", *ESA-EUSC 2005: Image Information Mining – Theory and Application to Earth Observation*, Frascati, Italy, October 2005.
8. D. Gencaga, "On The Performance Comparison of Gradient Type Joint-Process Estimators in Adaptive Signal Processing", *13th European Signal Processing Conference (EUSIPCO 2005)*, Antalya, Turkey, September 2005.
9. D. Gencaga, "Estimation of Time-Varying Autoregressive Symmetric Alpha Stable Processes by Particle Filters", *13th European Signal Processing Conference (EUSIPCO 2005)*, Antalya, Turkey, September 2005.
10. D. Gencaga, "Bayesian Separation of Non-Stationary Mixtures of Dependent Gaussian Sources", *25th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering (MaxEnt 2005)*, San Jose, CA, USA, August 2005.
11. D. Gencaga, "Time-varying autoregressive parameter estimation of Cauchy processes by particle filters" (English), "Zamanla Degisen Ozbaglanimli Cauchy Sureclerinin Parcacik Suzgecleri ile Kestirimi" (Turkish), *13th IEEE Signal Processing and Communications Applications Conference (IEEE-SIU 2005)*, Kayseri, Turkey, May 2005.
12. D. Gencaga, "Online Independent Component Analysis" (English), "Cevrimici Bagimsiz Bilesen Ayristirilmesi", *11th Signal Processing and Communications Applications Conference*, Istanbul, Turkey, June 2003.
13. D. Gencaga, "Real-time Formant Frequency Estimator for Speech Signals" (English), "Konusma Isaretleri icin Gercek Zamanli Bir Formant Frekans Kestiricisi", *10th Signal Processing and Communications Applications Conference*, Pamukkale, Denizli, Turkey, June 2002.

14. D. Gencaga, “Adaptive Escalator Filter for System Identification” (English), “Sistem Belirlenmesi için Merdiven Tipi Uyarlanir Suzgec Yapisi”, *10th Signal Processing and Communications Applications Conference*, Pamukkale, Denizli, Turkey, June 2002.

15. D. Gencaga, “Adaptive Escalator Filter for Acoustic Echo Cancellation” (English), “Akustik Yanki Giderimi için Merdiven Tipi Uyarlanir Suzgec Yapisi”, *10th Signal Processing and Communications Applications Conference*, Pamukkale, Denizli, Turkey, June 2002.

TEACHING EXPERIENCE

Guest Lecturer:

“Bayesian Data Analysis and Signal Processing (Prof. Kevin H. Knuth)”, Fall 2007 semester, Department of Physics, University at Albany.

“Computational Physics (Prof. Kevin H. Knuth)”, Spring 2008 semester, Department of Physics, University at Albany.

Teaching Assistant in the following courses at the Department of Electrical and Electronic Engineering, Bogazici University between 2000-2007:

Digital Signal Processing, Introduction to Information Theory, Signals and Systems, Communication Engineering, Speech processing, Numerical methods in Electrical Engineering, Electrical Circuits, Electrical Circuits Laboratory, Communication Laboratory

References available upon request.