

ERDEM YORUK

Place-Date of birth: Ankara/TURKEY – 05/17/1978
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EDUCATION

2005 – present	PhD: Johns Hopkins University - Department of Applied Mathematics and Statistics, Baltimore, MD – USA
2002 – 2004	MS: Bogazici University - Department of Electrical and Electronic Engineering, Istanbul - TURKEY medium of instruction: English overall GPA: 3.81/4.00
1997 – 2002	BS: Bogazici University - Department of Electrical and Electronic Engineering, Istanbul - TURKEY medium of instruction: English overall GPA: 3.42/4.00
1989 – 1997	Istanbul Erkek Lisesi, Istanbul - TURKEY medium of instruction: German overall GPA: 10.00/10.00 (ranked 1 st amongst 144 graduates)

ACADEMIC RESEARCH EXPERIENCE

Work in Progress	Graduate research: Computation of White Matter Connectivity - A physical model of the DT field as a spring network, where each tensor-node is connected to its neighborhood via springs whose constants are determined from the local structure and the direction of connection. Given a seed (or a region, i.e. a set of seeds) whose potential is temporarily kept fixed, variational approach to minimize total spring energy, whose steady state is interpreted as the underlying connectivity. Equivalence of the PDE derived from the Euler-Lagrange equation to the diffusion process. Novel and robust scheme to tract fibers from computed connectivity maps. Advisor: Assist. Prof. Burak Acar
Work in Progress	Graduate research: 3D segmentation of MR-DT brain images using Normalized Cut algorithm - Determination of underlying segments with graph partitioning techniques as a solution of a generalized eigenvalue problem with a guaranteed global optimal solution. Assessment of possible similarity/proximity measures defined for diffusion tensors. Reduction of memory and computational requirements by assessing subvolume analysis and sparse eigen-solvers. Advisor: Assist. Prof. Burak Acar
Spring 2004	MS thesis: Hand Biometrics - Person authentication based on hand images of individuals captured with unconstrained pose and accessories. Automatic registration of deformable hand shapes by normalizing their posture to standard relaxed alignments of individual fingers and global hand based on hand anatomy. Texture enhancement and extraction of palm print features using coherence enhancing diffusion PDEs. Extraction and fusion of shape, size and texture features using Principal and Independent Component Analyses. Identification/Verification results are quite satisfying with a performance of 98.7% among 500 individuals with a recording time lapse of 6 months and 2 training images per person.

Committee members: Prof. Bülent Sankur (Thesis Supervisor), Prof. Lale Akarun, Assist. Prof. Burak Acar

- Fall 2003 **Graduate research:** Structure preserving regularization of DTI tensor's principal eigenvector field using nonlinear anisotropic diffusion PDEs as a preprocessing for *in vivo* fiber tractography – Definition of the structure sensitive function from local regularity in the orientation of PDD vectors, as a better metric than FA in reflecting fiber bundles. Derivation of regularizing tensors from vector field and local structure only. Diffusion filtering in matrix valued image of DTI vectors' smoothed tensor product, which maps antipodal vectors to the same point in R^6 , while preserving differences in orientation. Reconstruction of regularized PDD field from their filtered orientation tensors. Assessment of performance in improved tractography results.
Advisor: Assist. Prof. Burak Acar
- Spring 2003 **Graduate research:** Robust color image segmentation using PDE-based regularization and Watershed transform – Preprocessing with anisotropic PDE-based regularization schemes applied to vector valued color images using Di-Zenzo metric. An extension of Watersheds and region merging for segmenting color images.
Advisor: Assist. Prof. Burak Acar
- Fall 2002 **Graduate research:** Automatic face detection using skin color information, histogram and multi-scale template matching.
Advisor: Prof. Lale Akarun
- Spring 2002 **Undergraduate Senior Project:** Pose invariant analysis and segmentation of faces and salient facial features based on the detection of bilateral symmetry between and within face components.
Advisor: Prof. Bülent Sankur

PUBLICATIONS

- October, 2005 **Erdem Yörük**, Burak Acar, Roland Bammer “A Physical Model for DT-MRI Based Connectivity Map Computation” Lecture Notes in Computer Science, Vol. 3749 / Part 1, pp. 213-220, Springer, 2005 (MICCAI 2005, Palm Springs, CA, USA)
- September, 2005 **Erdem Yörük**, Burak Acar, “Structure Preserving Regularization of DT-MRI Vector Fields By Nonlinear Anisotropic Diffusion Filtering” Proceedings of EUSIPCO 2005, European Signal Processing Conference, September 4-8, 2005, Antalya, Turkey
- January, 2005 **Erdem Yörük**, Helin Dutagaci, Bülent Sankur “Hand Based Biometry” Proceedings of SPIE 2005, January 16-20, 2005, San Jose, CA, USA
- November, 2004 **Erdem Yörük**, Helin Dutagaci, Bülent Sankur, “Hand Biometrics”, Pattern Recognition Letters (in print)
- October, 2004 **Erdem Yörük**, Ender Konukoglu, Bülent Sankur, Jerome Darbon, “Shape Based Hand Recognition”, IEEE Transactions on Image Processing (in print)
- September, 2004 **Erdem Yörük**, Ender Konukoglu, Bülent Sankur, Jerome Darbon, “Person Authentication Based On Hand Shape”, Proceedings of EUSIPCO 2004, 12th European Signal Processing Conference, September 6-10, 2004, Vienna/Austria
- April, 2004 **Erdem Yörük**, Ceyhan Burak Akgül, “Color Image Segmentation using PDE-based Regularization and Watershed Transformation”, Proceedings of IEEE-SIU 2004, IEEE 12th Signal Processing and Telecommunication Applications Conference, April 28-30, 2004, Kusadasi/Turkey
- April, 2004 **Erdem Yörük**, Ender Konukoglu, Bülent Sankur, Jerome Darbon, “Shape Based Hand Recognition”, Proceedings of IEEE-SIU 2004, IEEE 12th Signal Processing and

Telecommunication Applications Conference, April 28-30, 2004 Kusadasi/Turkey
(ranked first in student paper contest)

SCHOLARSHIPS & AWARDS

2005 – present	TUBITAK – Scientific and Research Foundation of Turkey, PhD scholarship
April, 2004	IEEE-SIU 2004, “Alper Atalay” Best Student Paper Award for the paper entitled “Shape Based Hand Recognition”
June, 2002	Dean’s Honor Roll
2000 – 2002	“Alper Atalay” fellowship
1998 – 2002	“Istanbul Erkek Liseliler Vakfi” scholarship (from my highschool for ranking 1 st in graduation)
1997 – 2002	Bogazici University scholarship (for entering the Department of Electrical and Electronic Engineering among the top 10)
1997 – 2002	“ERDEMIR Vakfi” scholarship (for ranking 84 th and 92 nd amongst 1.2 million students in the two successive nationwide university entrance examinations in 1997)
1997	DAAD (Deutscher Akademischer Austauschdienst) scholarship (from German Ministry of Education for ranking 1 st in graduation from my highschool “Istanbul Erkek Lisesi”)

PROFESSIONAL WORK EXPERIENCE

09/2005 – present	Graduate teaching assistantship at Johns Hopkins University – Department of Applied Mathematics and Statistics, Baltimore, MD - USA Courses involved as TA: <i>Spring 2006:</i> AMS 111 Introduction to Probability and Statistics <i>Fall 2005:</i> AMS 291 Linear Algebra and Differential Equations <i>Fall 2005:</i> AMS 303 Differential Equations
10/2002 - 08/2005	Graduate teaching and research assistantship at Bogazici University - Department of Electrical and Electronic Engineering, Signal & Image Processing Laboratory (BUSIM: http://busim.ee.boun.edu.tr/) and Volumetric Analysis & Visualization Group (VAVLAB: http://www.vavlab.ee.boun.edu.tr/), Istanbul - TURKEY Courses involved as TA: <i>Fall 2002:</i> EE 210 Electric Circuits 1 <i>Fall 2003/2004:</i> EE 479 Communication Laboratory <i>Fall 2003/2004:</i> EE 497 Java Programming, EE 677 Detection Estimation Theory <i>Spring 2003/2004/2005:</i> EE 202 Electric Circuits 2, EE 574 Special Topics in Image Processing
08-09/2001	Internship at repas AEG Automation GmbH, Istanbul - TURKEY Worked on theory and configuration of SCADA (Supervisory Control and Data Acquisition) systems.
01-02/2001	Internship at GVZ Speech Technologies and Software Services Co., Istanbul - TURKEY Trained in the research and development department of the company. Worked on software development of speech recognition, speech synthesis, text-to-speech and speech-to-text processes.

- 07-08/2000 **Internship at Electronic Workshop of ERDEMIR Iron & Steel Co., Ereğli-Zonguldak - TURKEY**
 Designed, mounted and fixed electrical and electronic devices that were used in various fields of the factory. Advanced in making use of measuring instruments in analysis of electrical circuitry and learned characteristics of various nonlinear components.
- 07-08/1999 **Internship at repas AEG Automation GmbH, Dreieich - GERMANY**
 Attended a 2-week training course on SCADA (Supervisory Control and Data Acquisition) systems.

ORGANIZATIONAL WORK EXPERIENCE

- 25-18/10/2001 **Crew in 23rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Istanbul - TURKEY**
- 18-19/10/1999 **Crew in OSCE Istanbul Summit, Istanbul - TURKEY**

LANGUAGES

- Turkish** Native
- English** Fluent in written and spoken language
 (achieved TOEFL score of 270/300 in computer based test taken in 12/2003)
- German** Fluent in written and spoken language
 (achieved 'Sprachdiplom' of second level from official German proficiency exam)
- French** Beginner level

COMPUTER SKILLS

- Programming Languages** C/C++, Visual C++, Java, Matlab, Mathematica, Labview, HTML, Autocad
- Electronic Design** Motorola 8-bit Microcontroller Assemblers, Electronic Workbench 5.0, Microsim Designlab 8.0, Spice
- Document Preparation** LaTeX, MS Word, MS Powerpoint, MS Excel