April 29, 2009

Esther Ezra phone (919) 660-6578

Levine Science Research Center D340 fax (919) 660-6502

Department of Computer Science, Duke University `http://www.math.tau.ac.il/~estere`

Durham NC 27708 `esther@cs.duke.edu`

Education

- **Tel-Aviv University** October 2002 - August 2007
  Tel-Aviv, Israel

  - Ph.D. with Distinction in Computer Science
  - Advisor: Prof. Micha Sharir
  - Dissertation: *Geometric Arrangements: Substructures and Algorithms*

- **Tel-Aviv University** October 1998 - September 2002
  Tel-Aviv, Israel

  - M.Sc., Summa Cum Laude in Computer Science
  - Advisor: Prof. Dan Halperin
  - Thesis: *Robust and Efficient Boolean Operations on Planar Subdivisions*

- **Tel-Aviv University** October 1992 - October 1996
  Tel-Aviv, Israel

  - B.Sc., Cum Laude, Statistics and Computer Science

Main Research Interests

- **Computational Geometry**

- **Discrete Geometry**

- **Geometric Optimization**

- **Sensor Networking**

Awards

- **Minerva Post-Doctoral Fellowship** 2007-08
  The Minerva Fellowship Program,
  Freie Universitt Berlin, Institute of Computer Science, Berlin, Germany

- **PIMS Post-Doctoral Fellowship** 2007-08
  Algorithms and Complexity Theory Laboratory,
  Simon Fraser University, Vancouver, British Columbia, Canada

- **IBM Ph.D. Fellowship** 2006-07
  IBM Research

- Best Achievement Award in studies towards Ph.D. degree,
School of Computer Science, Tel-Aviv University

- Tel-Aviv University

Conference & Journal Publications

- ***Efficient Sensor Placement for Surveillance Problems***, (with Pankaj K. Agarwal, Shashidhara Ganjugunte), *Proceedings of the 5th IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS '09)*, to appear.

- ***Near-Linear Approximation Algorithms for Geometric Hitting Sets***, (with Pankaj K. Agarwal, Micha Sharir), *Proceedings of the 25th Annual ACM Symposium on Computational Geometry (SOCG'2009)*, to appear.

- ***Small-Size ε-Nets for Axis-Parallel Rectangles and Boxes***, (with Boris Aronov, Micha Sharir), *Proceedings of the 41th ACM Symposium on Theory of Computing (STOC'2009)*, to appear.

  Also submitted to *Journal of the ACM*.

- ***On the Union of Cylinders in Three Dimensions***, *Proceedings of the 49th Annual IEEE Symposium on Foundations of Computer Science (FOCS'2008)*, 2008, pp. 179–188.

  Also submitted to *Discrete and Computational Geometry*, invited by editors.

- ***Almost Tight Bound for the Union of Fat Tetrahedra in Three Dimensions***, (with Micha Sharir), *Proceedings of the 48th Annual IEEE Symposium on Foundations of Computer Science (FOCS'2007)*, 2007, pp. 525–535.

  Also submitted to *Journal of the ACM*.

- ***On Regular Vertices on the Union of Planar Objects***, (with János Pach, Micha Sharir), *Discrete and Computational Geometry*, 41(2):216–231 (2009).

  Also in *Proceedings of the 23th Annual ACM Symposium on Computational Geometry (SOCG'2007)*, 2007, pp. 220–226.

- ***On the ICP Algorithm***, (with Micha Sharir, Alon Efrat), *Computational Geometry: Theory and Applications*, 41(1-2):77–93 (2008). *Special Issue, selected papers of the 22th European Workshop of Computational Geometry (EWCG'2006)*, 2006.

  Also in *Proceedings of the 22th Annual ACM Symposium on Computational Geometry (SOCG'2006)*, 2006, pp. 95–104.

- ***On a Single Cell in an Arrangement of Convex Polyhedra in*** $\mathbb{R}^3$, (with Micha Sharir), *Discrete and Computational Geometry*, 37:21–41 (2007). *Special Issue, selected papers of SOCG'2005*.

  Also in *Proceedings of the 21th Annual ACM Symposium on Computational Geometry (SOCG'2005)*, 2005.

- ***Counting and Representing Intersections Among Triangles in Three Dimensions***, (with Micha Sharir), *Computational Geometry: Theory and Applications*, 32:196–215 (2005).

  Also in *Proceedings of the 20th Annual ACM Symposium on Computational Geometry (SOCG'2004)*, 2004.

- ***Output-Sensitive Construction of the Union of Triangles***, (with Micha Sharir), *SIAM J. Computing*, 34(6) 1331–1351 (2005).

  Also in *Proceedings of the ACM-SIAM Symposium on Discrete Algorithms (SODA'2004)*, 2004.

- ***Speeding Up the Incremental Construction of the Union of Geometric Objects in Practice***, (with Dan Halperin, Micha Sharir), *Computational Geometry: Theory and Applications*, 27:63–85 (2004). *Special Issue, selected papers of the 18th European Workshop of Computational Geometry (EWCG'2002)*, 2002.

  Also in *Proceedings of the 10th European Symposium on Algorithms (ESA 2002)*, 2002.

- ***The Design and Implementation of Planar Maps in CGAL***, (with Eyal Flato, Dan Halperin, Iddo Hanniel, Oren Nechushtan), *ACM Journal of Experimental Algorithms*, 5: Article No. 13 (2000).

Manuscripts

- ***Lower Envelopes of 3-Intersecting Surfaces in*** $\mathbb{R}^3$, (with Micha Sharir).

In Preparation

- ***Weak ε-nets for Axis-Parallel Boxes in d-space***.

- ***Minimum Weight Matching in Unit Disk Graphs***, (with Pankaj K. Agarwal, Shashidhara Ganjugunte).

Conference Talks and Invited Seminars

- ***Near-Linear Approximation Algorithms for Geometric Hitting Sets***. Presented at Tel-Aviv University (Israel).

- ***Small-Size ε-Nets for Axis-Parallel Rectangles and Boxes***. Presented at Dagstuhl (Germany), NYU Courant (NY), Duke University (NC), the Technion (Israel), Haifa University (Israel), the Hebrew University (Israel).

- ***On the Union of Cylinders in Three Dimensions***. Presented at FOCS'08 Philadelphia (PA), Oberwolfach (Germany), Google Research Labs (NY), Polytechnic University (NY), Stony Brook University (NY), City University of NY (NY), Duke University (NC), Tel-Aviv University (Israel).

- ***Almost Tight Bound for the Union of Fat Tetrahedra in Three Dimensions***. Presented at FOCS'07 Providence (RA), MIT (MA), University of Stony Brook (NY), Princeton University (NJ) , *AT&T* Research Labs (NJ), NYU Courant (NY), Polytechnic University Brooklyn (NY), IBM Almaden Research Labs (CA), Stanford University (CA), Dagstuhl (Germany), IBM Haifa Research Labs (Israel) and University of Haifa (Israel).

- ***On the ICP Algorithm***. Presented at SOCG'06 - Sedona (Arizona), and EWCG'2006 - Delphi (Greece).

- ***On a Single Cell in an Arrangement of Convex Polyhedra in*** $\mathbb{R}^3$. Presented at SOCG'05 - Pisa (Italy), and Nacsholim (Israel).

- ***Counting and Representing Intersections Among Triangles in Three Dimensions***. Presented at SOCG'04 - Brooklyn (NY), and at the Technion (Israel).

- ***Output-Sensitive Construction of the Union of Triangles***. Presented at SODA'04 - New Orleans (LA), MSRI (Berkeley), and at the Technion (Israel).

- ***Speeding Up the Incremental Construction of the Union of Geometric Objects in Practice***. Presented at ESA'02 - Rome (Italy), and EWCG'02 - Warsaw (Poland).

Teaching Experience

- **School of Computer Science, Tel-Aviv University**   October 2005 - February 2006
  - Teaching assistant for *Geometric Optimization*.

- **School of Computer Science, Tel-Aviv University**   October 2004 - February 2005
  - Teaching assistant for *Computational Geometry*.

- **School of Computer Science, Tel-Aviv University**   October 2002 - June 2005
  - Frontal teaching in *Object Oriented Programming in C++*.

- **Faculty of Engineering, Tel-Aviv University**   October 2000 - February 2003
  - Frontal teaching in *Introduction to Programming in C*.

- **School of Computer Science, Tel-Aviv University**   October 1998 - October 2000
  - Teaching assistant in various courses for undergraduated students, including *Programming in C*, *Information Systems*, *Statistics*.

Work Experience

- **Department of Computer Science, Duke University**   September 2007 - present
  Postdoctoral Researcher, supervised by Prof. Pankaj Agarwal

- **IBM Haifa Research Labs**   July-October 2006
  Summer internship with Shai Fine
  - Study cuttings in computational geometry in the context of Verification. Design an efficient algorithm to the Constraint Satisfaction Problem, where the constraints are halfspaces in $\mathbb{R}^d$.

- **CGAL Project, Tel-Aviv University**   October 2000 - October 2002
  Algorithm developer and programmer at the CGAL project

– The target of the CGAL project, developed in collaboration with several universities in Europe, is to develop robust algorithms in computational geometry, and to incorporate them in a C++ library, based on the principals of generic programming and STL.

- **IDF, Israel** October 1996 - August 2000
  Algorithm developer and programmer in the area of GIS

    – Worked with Prof. Y. Deutcher, Department of Civil Engineering, Technion.

Professional Activities

- Reviewer for *ACM Symposium on Computational Geometry*

- Reviewer for *ACM-SIAM Symposium on Discrete Algorithms*

- Reviewer for *IEEE Symposium on Foundations of Computer Science*

- Reviewer for *International Journal of Computational Geometry and Applications*

- Reviewer for *Computational Geometry: Theory and Applications*

- Reviewer for *Discrete and Computational Geometry*

Program Committee

- *ACM-SIAM Symposium on Discrete Algorithms 2010.*

References

Pankaj K. Agarwal , Department of Computer Science, Duke University, Durham NC, USA. Phone: +1-919-660-6548. `http://www.cs.duke.edu/~pankaj/`
`agarwal@cs.duke.edu`

Boris Aronov , Department of Computer and Information Science, Polytechnic Institute of NYU, Brooklyn NY, USA. Phone: +1-718-260-3092. `http://cis.poly.edu/~aronov/`
`aronov@cis.poly.edu`

Shai Fine , IBM Research Lab in Haifa, Israel. Phone: +972-4-829-6295.
`http://www.haifa.il.ibm.com/dept/svt/simulation_vsml.html/`
`fshai@il.ibm.com`

Dan Halperin , School of Computer Science, Tel Aviv University, Tel Aviv Israel. Phone: +972-3-640-6478. `http://www.math.tau.ac.il/~danha/`
`danha@post.tau.ac.il`

Joseph S.B. Mitchell , Department of Applied Mathematics and Statistics, Stony Brook University, NY, USA. Phone: +1-631-632-8366. `http://www.ams.sunysb.edu/~jsbm/`
`jsbm@ams.stonybrook.edu`

János Pach , Department of Computer Science, City University of NY (CUNY), NY, USA; Courant Institute of Mathematical Sciences, New York University, NY, USA; Renyi Institute, Budapest, Hungary. Phone: +1-212-998-3184.
`http://www.math.nyu.edu/~pach/`
`pach@cims.nyu.edu`

Micha Sharir , School of Computer Science, Tel Aviv University, Tel Aviv Israel; Courant Institute of Mathematical Sciences, New York University, NY, USA. Phone: +972-3-640-8804. `http://www.math.tau.ac.il/~michas/`
`michas@post.tau.ac.il`