

# Fumiko Futamura

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## EDUCATION

*Ph.D.*, Mathematics, Vanderbilt University, May 2007

- Advisor: Professor Akram Aldroubi
- Dissertation: Symmetrically Localized Frames, Localized Operators and Their Application to the Construction of Localized Hilbert and Banach Frames

*M.S.*, Mathematics. Vanderbilt University, 2004

*B.A.*, Mathematics. University of Louisville, 2002

- Minor: Fine Arts
- Graduated Summa Cum Laude, 3.94 GPA
- Advisor: Professor Robert Powers
- Honors thesis: On the Use of Polygonal Diagrams to Depict Finite Affine Planes

## PUBLICATIONS

F. Futamura, *Symmetrically localized frames and the removal of subsets of positive density*, Journal of Mathematical Analysis and Applications, **326** no. 2, (2007) 1225–1235.

F. Futamura, *Banach framed, decay in the context of localization*, Sampl. Theory Signal Image Process. **6** no. 2, (2007) 151–166.

A. Aldroubi and F. Futamura, *Localized operators and the construction of localized frames*, in preparation, 2006.

## RESEARCH INTERESTS

Frame theory, time-frequency analysis, wavelet analysis, sampling theory, operator theory

## PRESENTATIONS

Conference talks:

- August 2006: *Localized Operators and the Construction of Localized Frames*, International Conference of Harmonic Analysis and Applications, San Luis, Argentina.

- May 2006: *Symmetrically Localized Frames*, Current Trends in Harmonic Analysis and Its Applications: Wavelets and Frames, University of Colorado at Boulder.
- May 2005: *On Localized Frames*, International Conference on Modern Methods of Time-Frequency Analysis, Strobl, Austria.
- March 2005: *On Localized Frames*, Southeastern Sectional Meeting, Western Kentucky University.
- May 2002: *On the Use of Polygonal Diagrams to Depict Finite Affine Planes*, Annual Meeting of KYMAA.

Seminar talks:

- October 2006: *Localized Operators and the Construction of Localized Frames*, Analysis Seminar, Texas A&M University.
- October 2006: *Localized Operators and the Construction of Localized Frames*, Computational Mathematics Seminar, Sam Houston State University.
- October 2006: *Localized Operators and the Construction of Localized Frames*, Analysis Seminar, University of Houston.
- September 2006: *Localized Operators and the Construction of Localized Frames*, Computational Analysis Seminar, Vanderbilt University.
- March 2005: *On Localized Frames*, Computational Analysis Seminar, Vanderbilt University.

Undergraduate seminar talks:

- October 2006: *How to Get into Graduate School in Mathematics*, Vanderbilt Math Club, Vanderbilt University.
- October 2006: *Intersections and Parallels, How an Artist Sees Mathematics*, MAA Student Chapter, Sam Houston State University.
- September 2006: *How to Win at Dots and Boxes Using Combinatorial Game Theory*, Vanderbilt Math Club, Vanderbilt University.
- October 2005: *Mathematical Influences in Art, from Picasso to Escher to Man Ray*, Undergraduate Seminar in Mathematics, Vanderbilt University.
- May 2005: *Whistling Girls and Crowing Hens: Women in Mathematics from Ancient to Modern Times*, joint talk with Dr. Jo Ann Staples, Undergraduate Seminar in Mathematics, Vanderbilt University.
- March 2005: *The Poincaré Conjecture*, Vanderbilt Math Club, Vanderbilt University.
- November 2004:  *$\Phi = 1.61803399\dots$* , Undergraduate Seminar in Mathematics, Vanderbilt University.

Art exhibits:

- 2006: *Self-Portraits as Other People's Preconceptions*, installation of eight paintings, oil on canvas, 60 in×36 in, Evoke/Invoke/Provoke, A Multimedia Project of Discovery.
- 2004: *Meret's Nambu*, painting, oil on canvas, 50 in×30 in, Sarratt Student Art Show.

- 2002: *Mentally bound*, sculpture piece, wax; cheesecloth; wood; chicken wire, 52 in×25 in×28 in, University of Louisville Student Art Show.

## TEACHING EXPERIENCE

Classes taught:

- Spring 2007: *First Year Accelerated Calculus 155B*, full instructor of two sections with graduate TA supervision duties.
- Fall 2006: *First Year Accelerated Calculus 155A*, full instructor of two sections with graduate TA and undergraduate grader supervision duties.
- Spring 2006: *First Year Calculus 150B*, full instructor.
- Fall 2005: *First Year Calculus 150A*, full instructor.
- Spring 2005: *First Year Calculus 150B*, full instructor.
- Fall 2004: *First Year Calculus 150A*, full instructor.
- Spring 2004: *First Year Accelerated Calculus 155B*, teaching assistant for two sections.
- Fall 2003: *First Year Calculus 150A*, full instructor.

Professional training:

- 2007: *Professor 101 Workshop* Vanderbilt University Center for Teaching.
- 2005-2006: *GradSTEP (Graduate Student Teaching Event for Professional Development)* Vanderbilt University Center for Teaching.
- 2005: *Professional Development Working Group*, Vanderbilt University Center for Teaching.
- 2003-2006: *Student Group Analysis*, participation in voluntary mid-semester evaluations through Vanderbilt University Center for Teaching.
- 2002: *Teaching Assistant Orientation Workshop*, Vanderbilt University Center for Teaching.

## COMMUNITY INVOLVEMENT

2006: *Panel member, Mathematics and Mingling: The Undergraduate Math Club*, Project NExT session at Mathfest 2006, Knoxville, TN.

2006: *Graduate student advisor*, Annual Vanderbilt University High School Mathematics Competition, Vanderbilt University.

2005-current: *Co-founder, graduate student advisor*, Math Club, Vanderbilt University.

2005-2006: *Volunteer math tutor and mentor* through the Pencil Foundation, Rose Park Metro Public Middle School, Nashville TN.

2003-2005: *Coordinator*, Prospective Graduate Student Lunch, Vanderbilt University.

2002-2003: *Co-organizer*, Graduate Student Tea, Vanderbilt University.

2001-2002: *President*, Women of Mathematics Club, University of Louisville.

## HONORS AND AWARDS

2007: *B.F. Bryant Prize for Excellence in Teaching*, Vanderbilt University.

2007: *Selected Presenter*, Poster presentation, *Localized Operators and the Construction of Localized Frames*, AWM Workshop for Women Graduate Students and Recent PhDs, Joint Mathematics Meetings, New Orleans, LA.

2002-2007: *Graduate Teaching Assistantship*, Vanderbilt University.

2006: *Graduate Student Travel Grant*, Vanderbilt University.

2005-2006: *Summer Research Assistantship* with A. Aldroubi, Vanderbilt University.

2006: *Selected visual artist participant*, Judy Chicago and Donald Woodman's participatory art pedagogy project, the Multimedia Project of Discovery, Vanderbilt University.

2002-2003: *Fall and Spring Semester Research Assistantship* with M. Neamtu, Vanderbilt University.

2002: *Phi Beta Kappa Award*, University of Louisville.

2002: *Mary Ruth Brookover Award*, Top Senior in Mathematics, University of Louisville.

2001: *Robert J. Bickel Scholarship*, Top Junior in Mathematics, University of Louisville.

1999-2002: *Trustee's Academic Scholarship* (full tuition and housing), University of Louisville.

1999-2002: *KHEES (Kentucky Higher Educational Excellence Scholarship)*, State of Kentucky.

## CONFERENCES ATTENDED

May 2005: The Third Annual Spring Institute on Noncommutative Geometry and Operator Algebras, Vanderbilt University.

March 2005: 2005 Spring Southeastern Sectional Meeting, Special Session on Wavelets and Multiwavelets, Western Kentucky University.

November 2004: MGA Workshop V: Math Analysis and Multiscale Geometric Analysis, Institute of Pure and Applied Mathematics (IPAM) at University of California, Los Angeles.

October 2004: 2004 Fall Southeastern Section Meeting, Special Session on Wavelets, Frames, and Sampling, Vanderbilt University.

July 2004: Workshop in Knots and 3-Manifolds, Pacific Institute for the Mathematical Sciences, University of British Columbia, Vancouver, Canada.

May 2004: Second International Conference on Computational Harmonic Analysis, Vanderbilt University.

May 2004: The Second Annual Spring Institute on Noncommutative Geometry and Operator Algebras, Vanderbilt University.

January 2004: Noncommutative geometry in Mathematics and Physics, CIRM, Luminy, France.

April 2003: Third International Conference on Multivariate Approximation: Theory and Applications, Cancun, Mexico.

## **PROFESSIONAL SOCIETIES**

American Mathematical Society

Association for Women in Mathematics

Mathematical Association of America

## **ADDITIONAL INFORMATION**

Citizenship: Japan; U.S. permanent resident.

Computer Skills: html, css, Matlab, LaTeX, Maple, Mathematica

Languages Spoken: English (native), Japanese (native, proficient), Spanish (intermediate), French (basic)

## REFERENCES

Research:

Akram Aldroubi  
Professor of Mathematics  
Department of Mathematics  
1326 Stevenson Center  
Vanderbilt University  
Nashville, TN 37240 USA  
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Research:

Peter G. Casazza  
Professor of Mathematics  
Mathematics Department  
116 Mathematical Sciences Bldg  
University of Missouri  
Columbia, MO 65211 USA  
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Research:

Christopher E. Heil  
Professor of Mathematics  
School of Mathematics  
686 Cherry Street  
Georgia Institute of Technology  
Atlanta, GA 30332 USA  
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Teaching:

Dr. Jo Ann Staples  
Director of Teaching  
Department of Mathematics  
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