

Elisa H. Barney Smith

ADDRESS:

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EDUCATION:

Ph.D., Computer and Systems Engineering,

Rensselaer Polytechnic Inst., Troy, NY, December 1998

- *Thesis Topic:* "Optical Scanner Characterization Methods Using Bilevel Scans."
- *Thesis Advisor:* George Nagy
- *Committee Members:* Howard Kaufman, James Modestino, Mukkai Krishnamoorthy

MS, Computer and Systems Engineering,

Rensselaer Polytechnic Institute, Troy, NY, August 1989

- *Thesis Topic:* "Multivariable adaptive control of a biologic system with time delays and input restrictions."
- *Thesis Advisor:* Howard Kaufman

BS, Computer Science,

Rensselaer Polytechnic Institute, Troy, NY, May 1988

- Minors in Electrical Engineering and Economics

TEACHING EXPERIENCE:

Professor with tenure, Boise State University, Boise, ID July 2014 – Present

Associate Professor with tenure, Boise State University, Boise, ID July 2004 – June 2014

Associate Chair of Electrical & Computer Engineering, BSU July 2004 – July 2007

Assistant Professor, Boise State University, Boise, ID August 1999 – June 2004

Research area: image and signal processing, pattern recognition

Courses: Intro to Engineering (*freshman level*)
Intro to Modeling (*sophomore level*)
Introduction to Electric Circuits (*sophomore level*)
Signals & Transforms, and accompanying lab (*sophomore level*)
Signals & Systems, and accompanying lab (*junior level*)
System Modeling and Control (*junior level*)
Pattern Recognition (*senior and graduate levels*)
Digital Image Processing (*senior and graduate levels*)
Fuzzy Logic and Applications (*senior and graduate levels*)
Communication Systems (*senior and graduate levels*)
Linear Systems (*graduate level*)
Advanced Image Processing (*graduate level*)

Average teaching review = 1.38 on a 1-5 scale with 1 being best.

2005 Faculty Recognition of the Year Student's Choice Award, Associated Students of BSU

BSU Provost's Excellence in Advising Award, 2005, first year BSU offered this award.

Associate Chair Responsibilities: Developing course schedules, developing and updating advising materials, submitting and tracking curriculum changes, ABET accreditation

monitoring and reporting, assigning academic advisors, tracking enrollment and retention, degree clearance auditing, and other duties as assigned.

Sabbatical year at Universität des Saarlandes, Saarbrücken Germany, October 2007-July 2008
Sabbatical year, 6 months at LORIA, France, 3 months at TU Dortmund, Germany October 2014-July 2015

Adjunct, State University of New York (SUNY) at Plattsburgh, Plattsburgh, NY Spring 1999
Computer Science Senior Seminar: Introduction to Pattern Recognition.

Instructor, Rensselaer Polytechnic Institute, Troy, NY Fall 1997
Probability Theory and Applications. Four credit senior level course offered jointly by the Mathematics and Decision Science Departments.

New York State Secondary School Teaching Certification, 7-12 Math and Physics
Student Teaching: September - December 1995
Watervliet High School, Watervliet, NY.

- *Courses*: NY Math 1, Pre-Calculus, Calculus I.

Instructor, Three Rivers Comm. College, Norwich, CT, January 1992 - May 1993
• *Courses*: Pre-Algebra, Pre-Calculus, Calculus I.

Teaching Assistant, Rensselaer Polytechnic Institute, Troy, NY, January - July 1989,
September 1994 - May 1996

- *Courses*: Lumped Parameter Systems/Dynamic Systems - Sophomore General Eng. course
Linear Systems - Jr./Sr. Electrical, Computer & Systems Eng. (ECSE) course
Discrete Time Systems - Jr./Sr. ECSE course
Probability for Engineering Applications - Jr./Sr. ECSE course
Pattern Recognition - Graduate ECSE course
Fuzzy Sets and Expert Systems - Graduate ECSE course
- Twice nominated for the Electrical, Computer and Systems Engineering (ECSE) Outstanding TA Award.

Research Assistant, NSF grant for “The Application of Mathematics to Engineering and Science, Building the Links” a.k.a. “Project Links”, January 1996 – August 1998

- The project aims to increase integration of math and engineering concepts through visual/graphical/hands-on software modules. Developed software modules and associated laboratory assignments to illustrate properties and applications of probability and statistics. Integrated material originated by five faculty authors. Supervised several undergraduate HTML and JAVA coders. Participated in evaluation of modules. See <http://links.math.rpi.edu>.

RESEARCH/INDUSTRY EXPERIENCE:

LORIA (Laboratoire Lorrain de Recherche en Informatique et ses Applications = Lorraine Laboratory of IT Research and its Applications), Nancy, France October-December 2014, April-June 2015

- Visiting Scholar, through “Chercheur d’excellence” grant by the Région Lorraine
- Working with Dr. B. Lamiroy, on image analysis for typeface characterization in Renaissance documents.

Technische Universität Dortmund, Dortmund, Germany, November 2014-April 2015

- Visiting Scientist.
- Collaborating with colleagues on enhancing and segmenting WWI postcard image to increase information extraction capabilities.

Ecole Nationale Supérieure des Télécommunications(Telecom ParisTech), Paris, France May-July 2012

- Visiting Researcher.

- Collaborating with colleagues on projects to see how max/min trees can be used to improve Document Image Analysis.

Micron Technologies, Boise, ID

June-August 2011, June-July 2012

- Consultant.
- Evaluate capabilities and potential applications for a new technology.

LORIA (Laboratoire Lorrain de Recherche en Informatique et ses Applications = Lorraine Laboratory of IT Research and its Applications), Nancy, France

June-July 2009

- Visiting Scholar.
- Collaborating with colleagues on projects to see how Noise Spread can be used to improve Document Image Analysis.

CACI (formerly AMS/Vredenburg Inc.), Lanham, MD

September 2003-November 2004

- Consultant.
- Determining suitable image features to use in deciding what sort of filtering will most greatly improve OCR recognition rates for non-Latin scripts.

NATO SACLANT Centre, LaSpezia, Italy

May - August 1993

- Research on acoustic feature extraction for sonar signal classification using higher order spectral characteristics.
- One of two summer positions available to US citizens.

Naval Undersea Warfare Center, New London, CT

October 1989 - May 1993

- Developed automatic acoustic contact classification systems. Participated in system testing at sea.
- Developed phased-array signal processing software for sensor array performance testing.
- Work involved significant signal processing and decision theory.

Burroughs - Unisys, Paoli, PA

January - August 1985

- Developed and used software to extract information from defect database to aid quality engineers in defect reduction on the assembly plant floor.

PUBLICATIONS:

Books and Book Chapters

Elisa H. Barney Smith, "Chapter 1.2 – Document Creation, Image Acquisition and Document Quality," in Handbook of Document Image Processing and Recognition, Eds. D. Doermann and K. Tombre, Springer-Verlag, June 2014.

Laurence Likforman-Sulem and Elisa H. Barney Smith, "Bases De La Reconnaissance Des Formes," Technosup Collection, Ellipses Édition Marketing, October 2013.

Elisa H. Barney Smith, "Document Scanning," McGraw-Hill 2005 Yearbook of Science and Technology, McGraw-Hill, 2005.

Journal Papers

Kristy A Campbell, Kolton Drake, Elisa Barney Smith, "Pulse Shape and Timing Dependence on the Spike-Timing Dependent Plasticity Response of Ion-Conducting Memristors as Synapses," Frontiers in Bioengineering and Biotechnology 12/2016; 4(pt. B).

Arvin Farid, Mahsa Azad, Jim Browning, Elisa Barney Smith, “Electromagnetically-Induced Transport for Soil/Groundwater Remediation,” *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, Vol. 141, No. 3, March 2015, # 04014115. (*Nominated for the ASCE Middlebrooks Award*)

T. Hoang, E. H. Barney Smith, A. Tabbone, “Sparsity-based edge noise removal from bilevel graphical document images,” *International Journal of Document Analysis and Recognition*, Springer Verlag, Vol. 17, No. 2, June 2014, pp. 161-179.

A. Rothenbuhler, T. Tran, E. H. Barney Smith, V. Saxena, K. A. Campbell, “Reconfigurable Threshold Logic Gates using Memristive Devices,” *Journal of Low Power Electronics and Applications*, Vol. 3, 2013, pp. 174-193.

L. Likforman-Sulem, J. Darbon, E.H. Barney Smith, “Enhancement of historical printed document images by combining Total Variation regularization and Non-Local Means filtering,” *Image and Vision Computing*, Elsevier, Vol. 29, No. 5, 2011, pp. 351-363.

E. H. Barney Smith and X. Qiu, “Statistical Image Differences, Degradation Features and Character Distance Metrics” *International Journal of Document Analysis and Recognition*, Springer Verlag, Vol.6, No. 3, 2004, pp. 146-153. (*special issue, invited paper*).

E. H. Barney Smith, D. Monn, H. Veeramachaneni, K. Kise, A. Malizia, L. Todoran, A. El-Nasan, and R. Ingold, “Reports of the DAS02 working groups,” *International Journal of Document Analysis and Recognition*, Springer Verlag. Vol.6, No. 3, 2004, pp. 211-217.

E. H. Barney Smith, “Characterization of Image Degradation Caused by Scanning,” *Pattern Recognition Letters*, Vol. 19, No. 13, November 1998, pp. 1191-1197.

E. H. Barney Smith, C. Baltensperger, J. Drew, E. Siborg, “Target Rapid Automatic Classification System (TRACS) Development Methodology,” *Journal of Underwater Acoustics*, November 1993.

Technical Conference Papers

54. Elisa H. Barney Smith and Bart Lamiroy, “Circle Detection Performance Evaluation Revisited,” *Springer Lecture Notes in Computer Science*, Volume 9657, January 2016.

53. Elisa H. Barney Smith, Eric Maggard, Scott Line, Mark Shaw, “Quantifying Print Quality for Practice,” *NIP & Digital Fabrication Conference*, November 2015, pp. 157-162.

52. Elisa H. Barney Smith and Bart Lamiroy, “Effects of Clustering Algorithms on Typographic Reconstruction,” *International Conference on Document Analysis and Recognition*, Nancy, France, August 2015.

51. E. H. Barney Smith, G. Fink, “Template generation from postmarks using cascaded unsupervised learning,” *3rd International Workshop on Historical Document Imaging and Processing (HIP 2015)*, Nancy, France, August 2015, pp. 92-98.

50. Vahab Bolvardi, Arvin Farid, Atena Najafi, Jim Browning, and Elisa Barney Smith, “Laboratory Study of Electromagnetically Induced Contaminant Removal,” *International Foundations Congress & Equipment Exposition IFCEE 2015*, San Antonio, March 2015, pp. 2657-2666.

49. Atena Najafi, Vahab Bolvardi, Arvin Farid, Jim Browning, Elisa Barney Smith, “Laboratory Study of the Effect of Electromagnetic Waves on Airflow during Air Sparging,” *Proc. Annual Congress of the*

- Geo-Institute of ASCE (Geo-Congress) 2014 Technical Papers: Geo-Characterization and Modeling for Sustainability, February 2014, pp. 1602-1611.
48. Arvin Farid, Atena Najafi, Mahsa Azad, Jim Browning, Elisa Barney Smith, "Electromagnetically Induced Transport in Water for Geoenvironmental Applications," Proc. Annual Congress of the Geo-Institute of ASCE (Geo-Congress) 2014 Technical Papers: Geo-Characterization and Modeling for Sustainability, February 2014, pp. 1576-1585.
47. Atena Najafi, Sahba Azad, Arvin Farid, Jim Browning, Elisa Barney Smith, "Study of mechanisms governing electromagnetic alteration of hydraulic conductivity of soils," Proc. Annual Congress of the Geo-Institute of ASCE (Geo-Congress) 2014 Technical Papers: Geo-Characterization and Modeling for Sustainability, February 2014, pp. 1693-1702.
46. Arvin Farid, Mahsa Azad, Jim Browning, and Elisa H. Barney Smith, "Electromagnetic Stimulation of Transport in Water for Geoenvironmental Applications," Proc. of PIERS 2013, Stockholm, Sweden, August 2013, pp. 1843-1848.
45. Arvin Farid, Sahba Azad, Jim Browning, and Elisa H. Barney Smith, "Consequences of Electromagnetic Stimulation on Hydraulic Conductivity of Soils," Proc. of PIERS 2013, Stockholm, Sweden, August 2013, pp. 1510-1514.
41. Thanh Tran, Adrian Rothenbuhler, Elisa H. Barney Smith, Vishal Saxena and Kristy A. Campbell, "Reconfigurable Threshold Logic Gates using Memristive Devices," 2012 IEEE Subthreshold Microelectronics Conference, Waltham, MA, 9-10 October 2012.
43. Elisa H. Barney Smith, Chang An, "Effect of "Ground Truth" on Image Binarization," Proc. Document Analysis Systems, Gold Coast, Queensland, Australia, March 2012.
42. Mahsa Azad, Harlan Sangrey, Arvin Farid, Jim Browning, Elisa Barney Smith, "Interaction Between Electromagnetic Waves and Transport in Saturated Media," Proc. Annual Congress of the Geo-Institute of ASCE (Geo-Congress), March 2012.
41. Adrian Rothenbuhler, Elisa H. Barney Smith, Peter Müllner, "Application of image processing to track twin boundary motion in magnetic shape memory alloys," Proc. SPIE Image Processing: Machine Vision Applications V, Vol. 8300. San Jose, CA, Jan 2012. Paper 8300-0A.
40. Elisa H. Barney Smith, Shatakshi Goyal, Robbie Scott, Daniel Lopresti "Evaluation of Voting with Form Dropout Techniques for Ballot Vote Counting," Proc. International Conference on Document Analysis and Recognition, Beijing, China, September 2011, pp. 473-477.
39. Amy Winder, Tim Andersen, Elisa H. Barney Smith, "Extending Page Segmentation Algorithms for Mixed-Layout Document Processing," Proc. International Conference on Document Analysis and Recognition, Beijing, China, September 2011, pp 1245-1249.
38. Elisa H. Barney Smith, Daniel Lopresti, George Nagy, Ziyang Wu, "Towards Improved Paper-Based Election Technology," Proc. International Conference on Document Analysis and Recognition, Beijing, China, September 2011, pp. 1255-1259.
37. Thai V. Hoang, Elisa H. Barney Smith, Salvatore Tabbone, "Edge Noise Removal in Bilevel Graphical Document Images Using Sparse Representation," International Conference on Image Processing, Brussels, Belgium, September 2011, Paper #WP.PE.7.

40. C. J. Stanger, Thanh Tran and Elisa H. Barney Smith. "Descreening of Color Halftone Images in the Frequency Domain," Proc. SPIE Electronic Imaging - Color Imaging XVI: Displaying, Processing, Hardcopy, and Applications, San Francisco, CA, January 2011, Vol. 7866.
39. E. H. Barney Smith and J. Darbon and L. Likforman-Sulem. "A Mask-based enhancement method for historical documents," Proc. SPIE Electronic Imaging - Document Recognition and Retrieval XVIII, San Francisco, CA, January 2011, Vol. 7874.
38. G. Nagy, D. Lopresti, E. H. Barney Smith, Ziyang Wu. "Characterizing Challenged 2008 Minnesota Ballots," Proc. SPIE Electronic Imaging - Document Recognition and Retrieval XVIII, San Francisco, CA, January 2011, Vol. 7874.
37. D. Lopresti, G. Nagy, E. H. Barney Smith, "Document Analysis Issues in Reading Optical Scan Ballots," Proc. 9th IAPR International Workshop on Document Analysis Systems, Cambridge, MA, 9-11 June 2010.
36. Elisa H. Barney Smith, "An analysis of binarization ground truthing," Proc. 9th IAPR International Workshop on Document Analysis Systems, Cambridge, MA, 9-11 June 2010.
35. Elisa H. Barney Smith, "Relating electrophotographic printing model and ISO13660 standard attributes," Proc. Image Quality and System Performance VII, Vol. 7529, San Jose, CA, January 2010.
34. E. H. Barney Smith, L. Likforman-Sulem, J. Darbon, "Effect of Pre-processing on Binarization," Proc. Document Recognition and Retrieval XVII, Vol. 7534, San Jose, CA, January 2010.
29. G. Zheng, E. H. Barney Smith, N. Rafla and T. Andersen, "2x1D Image Registration and Comparison," Proc. SPIE Electronic Imaging - Image Processing: Machine Vision Applications III, Vol 7538, San Jose, CA, January 2010, paper #753838.
28. L. Likforman, J. Darbon, and E. H. Barney Smith, "Pre-processing of Degraded Printed Documents by Non-Local means and Total Variation," International Conference on Document Analysis and Recognition 2009, Barcelona, Spain, 26-29 July 2009.
27. G. Nagy, B. Clifford, A. Berg, G. Saunders, D. Lopresti, and E. H. Barney Smith, "Camera-based Ballot Counter," International Conference on Document Analysis and Recognition 2009, Barcelona, Spain, 26-29 July 2009.
26. P. Xiu, D. Lopresti, H. Baird, G. Nagy, and E. H. Barney Smith, "Style Based Ballot Mark Recognition," International Conference on Document Analysis and Recognition 2009, Barcelona, Spain, 26-29 July 2009.
25. G. Nagy, B. Clifford, G. Saunders, E. H. Barney Smith, D. Lopresti and A. Berg, "Document Photography in Vitro," Third International Workshop on Camera-Based Document Analysis and Recognition (CBDAR2009), Barcelona, Spain, 25 July 2009, pp. 26-33.
33. Craig McGillivray, Chris Hale, and Elisa H. Barney Smith, "Noise Effects in Bilevel Document Images," 3rd Workshop on Analytics for Noisy Unstructured Text Data (AND-09), Barcelona, Spain, 23-24 July 2009, pp.17-24.
32. Elisa H. Barney Smith, D. Lopresti, and G. Nagy, "Mark Detection from Scanned Ballots", Proc. Document Recognition and Retrieval XVI, San Jose, CA, January 2009, paper #72470P.

31. Edul N. Dalal, Elisa H. Barney Smith, Frans Gaykema, Allan Haley, Kerry Kirk, Don Kozak, Mark Robb, Tim Qian, Ming-Kai Tse, "INCITS W1.1 standards for perceptual evaluation of Text and Line Quality," Proc. SPIE Electronic Imaging, Image Quality and System Performance VI, San Jose, CA, January 2009, paper #724203.
30. E. H. Barney Smith, D. Lopresti, and G. Nagy, Proc. "Ballot Mark Detection", Nineteenth International Conference on Pattern Recognition, Tampa, Florida, 4-6 December, 2008.
29. D. Lopresti, G. Nagy, and E. Barney Smith, "A Document Analysis System for Supporting Electronic Voting Research," Proc. Eighth IAPR International Workshop on Document Analysis Systems, Nara, Japan, 16-19 September 2008, pp. 167-174.
19. Elisa H. Barney Smith, "Modeling Image Degradations for Improving OCR", (Invited paper), Proc. 16th European Signal Processing Conference, Lausanne, Switzerland, 25-29 August 2008.
18. D. K. Reed and E. H. Barney Smith, "Correlating degradation models and image quality metrics," Proc. SPIE Electronic Imaging, Document Recognition and Retrieval XV, Vol. 6815, San Jose, CA, January 2008, paper # 681508.
17. Chris Hale and Elisa H. Barney Smith, "Human Image Preference and Document Degradation Models," International Conference on Document Analysis and Recognition 2007, Curitiba, Brazil, September 2007, pp. 250-254.
16. T. Bouk, E. N. Dalal, K. D. Donohue, S. Farnand, F. Gaykema, D. Gusev, A. Haley, P. L. Jeran, D. Kozak, W. C. Kress, O. Martinez, D. Mashtare, A. McCarthy, Y. S. Ng, D. R. Rasmussen, M. Robb, H. Shin, M. Q. Slickers, E. H. Barney Smith, M-K. Tse, D. Williams, E. Zeise, S. Zoltner, "Recent progress in the development of INCITS W1.1, Appearance-based image quality standards for printers," Proc. SPIE Electronic Imaging, Image Quality and System Performance IV, Vol. 6494, San Jose, CA, January 2007, paper #64940K.
15. Charles Scott and Elisa H. Barney Smith, "An Unsupervised Fluoroscopic Analysis of Knee Joint Kinematics," Proc. 19th IEEE Symposium on Computer-Based Medical Imaging, Salt Lake City, Utah, June 2006, pp. 377-380.
14. E. H. Barney Smith, H. Baird, W. Barrett, F. Le Bourgeois, X. Lin, G. Nagy and S. Simske, "DIAL 2004 Working Group Report on Acquisition Quality Control," Proc. 2nd International Workshop on Document Image Analysis for Libraries 2006, France, April 2006, pp. 373-376.
28. E. H. Barney Smith, "PSF estimation by gradient descent fit to the ESF," Proc. SPIE Electronic Imaging, Image Quality and System Performance III, Vol. 6059, San Jose, CA, January 2006, paper #605914.
27. E. H. Barney Smith and T. Andersen, "Partitioning of the degradation space for OCR training," Proc. SPIE Electronic Imaging, Document Recognition and Retrieval XIII, Vol. 6067, San Jose, CA, January 2006, paper #606705.
26. E. H. Barney Smith and T. Andersen, "Text Degradations and OCR Training," International Conference on Document Analysis and Recognition 2005, Seoul, Korea, August 2005, pp. 834-838.
25. P. Garrison, D. Davis, T. Andersen, E. H. Barney Smith, "Study of style effects on OCR errors in the MEDLINE database," Proc. SPIE Electronic Imaging, Document Recognition and Retrieval XII, Vol. 5676, Santa Clara, CA, January 2005, pp. 28-37.

9. M. Norris and E. H. Barney Smith, "Printer Modeling for Document Imaging," Proc. 2004 International Conference on Imaging Science, Systems, and Technology (CISST'04), Las Vegas, Nevada, USA, June 21-24, 2004, pp. 14-20.
8. H.S. Yam and E. H. Barney Smith, "Estimating Degradation Model Parameters from Character Images," International Conference on Document Analysis and Recognition 2003, Edinburgh, Scotland, 3-6 August 2003, pp. 710-714.
7. R. Clements and E. H. Barney Smith, "Speedup of Optical Scanner Characterization Subsystem," Proc. SPIE Electronic Imaging, Document Recognition and Retrieval X, Vol. 5010, Santa Clara, CA, January 2003, pp. 94-102.
6. E. H. Barney Smith and X. Qiu, "Relating statistical image differences and degradation features," Proc. 5th International Workshop, Document Analysis Symposium 2002, Princeton, NJ, Springer Verlag LNCS 2423, August 2002, pp. 1-12.
5. E. H. Barney Smith, "Uniqueness of bilevel image degradations," Proc. SPIE Photonics West, Document Recognition and Retrieval IX, Vol. 4670, San Jose, CA, January 2002 , pp. 174-180.
4. E. H. Barney Smith, "Scanner Parameter Estimation Using Bilevel Scans of Star Charts," International Conference on Document Analysis and Recognition 2001, Seattle, WA, September 2001, pp. 1164-1168.
3. E. H. Barney Smith, "Bilevel Image Degradations: Effects and Estimation," 2001 Symposium on Document Image Understanding Technology, Columbia, MD, 23-25 April 2001, pp. 49-55.
2. E. H. Barney Smith, "Estimating Scanning Characteristics from Corners in Bilevel Images," Proc. SPIE Document Recognition and Retrieval VIII, San Jose, CA, 21-26 January 2001, pp.176-183.
1. E. H. Barney and H. Kaufman, "Model Reference Adaptive Control of Cardiac Output and Blood Pressure Through Two Drug Infusions," Proc. 5th IEEE International Symposium on Intelligent Control 1990, September 1990, pp. 739-744.

Other Technical Papers

E. H. Barney Smith, "A new metric describes the edge noise in bilevel images", SPIE online Newsroom, <http://newsroom.spie.org>, 13 October 2009, DOI: 10.1117/2.1200910.1829. <<http://spie.org/x37739.xml?highlight=x2410&ArticleID=x37739>>

Education Conference Papers

C. B. Muller, E. H. Barney Smith, J. Chou-Green, T. Daniels-Race, A. Drummond, K. Kuchenbecker, "The Power of External Mentors for Women Pursuing Academic Careers in Engineering and Science: Stories of MentorNet ACE and its Protégés and Mentors," Proc. of the 2007 WEPAN Conference, Lake Buena Vista, Florida, 10-12 June 2007.

R. Miller and E. H. Barney Smith, "Education by Design: Connecting Engineering and Elementary Education," Proc. Hawaii International Conference on Education, Honolulu, HI, January 2006, pp. 4539-4550.

E. H. Barney Smith and R. Miller, "Engineering for Educators," Proc. ASEE Annual Conference, Portland, OR, June 2005, paper #9259.

E. H. Barney Smith and E. Bringsjord, "An Analysis of the Comparative Effectiveness of a Computerized Module in Probability Theory," New England Educational Research Organization, 30th Annual Conference, Portland, ME, April 1998.

Posters

E. H. Barney Smith, "Optical Page Scanner System Modeling and Degradations," DOE Workshop at Pacific Northwest National Labs, Richland, WA, 4-6 June 2002

INVITED TALKS:

ECE Department Seminar, "Exploring the Intersection Between Document Image Processing and Digital Humanities," 1 February 2017.

Automatic Type Design Workshop, "Digital Humanities at Boise State: Melville's Marginalia Online," Atelier National de Recherche Typographique (ARNT), Nancy France, 18 November 2016.

IEEE Boise Signal Processing Society Chapter annual banquet, keynote talk, "A Wonderful Life," Boise, Idaho, 4 November 2015.

hPICS conference, keynote talk, "Do You Believe in Camelot?", Boise, Idaho, 16 November 2011.

Fujitsu, Beijing, China, Seminar, 18 October 2010.

Nanjing Normal University, Nanjing, China, Seminar, 12 October 2010.

Université Nancy 2/LORIA (Lorraine Laboratory of IT Research and its Applications), Nancy, France, Seminar, 24 June 2008.

Universität des Saarlandes, Saarbrücken, Germany, Ingenieurwissenschaftliches Kolloquium (talk was given in German), "Verbesserung von OCR durch Modellierung von Verschlechterungen der Bildqualität," 15 April 2008.

Telecom ParisTech, Paris, France, Seminar, 12 March 2008.

Unifei - Universidade Federal De Itajubá, Itajubá Brazil, Department of Computer Science Seminar, September 2007.

IEEE Boise Computer Society Chapter, Boise, Idaho, 8 April 2009.

Idaho High Performance Computing Workshop 2004, Sponsored by the Boise IEEE Computer Society Chapter, 22 October 2004.

Lehigh University, Department of Computer Science and Engineering Seminar, 30 April 2004.

University of Idaho, Department of Electrical & Computer Engineering Research Colloquium, 13 October 2000.

GRANTS:

<u>Image processing of neutron radiographs,</u> Idaho National Labs (INL), Battelle PI: Elisa H. Barney Smith	January-May 2017 \$20,914
<u>Faculty Visit Research Award,</u> Deutscher Akademischer Austausch Dienst (DAAD) PI: Elisa H. Barney Smith	January-March 2015 4600 €
<u>Adding Search to Melville's Marginalia Online</u> Gladys Kriebel Delmas Foundation Co-PIs: Steven Olsen-Smith and Elisa H. Barney Smith	March 2014 – May 2015 \$12,000
<u>ISGC NASA– Microgravity University</u> NASA Idaho Space Grants Consortium PI: Elisa H. Barney Smith	January 2014 – July 2014 \$10,000
<u>Objective Print Quality Analysis</u> Hewlett Packard, Printer and Laser Jet Division, Boise, ID PI: Elisa H. Barney Smith	November 2013 – August 2014 \$75,000
<u>CCF: Small: Realizing Chip-scale Bio-inspired Spiking Neural Networks with Monolithically</u> <u>Integrated Nano-scale Memristors</u> NSF, CCF PI: Elisa H. Barney Smith, Co-PIs: Vishal Saxena, Kris Campbell	July 2013 – June 2016 \$500,000
<u>ISGC NASA– Teacher Professional Development</u> NASA Idaho Space Grants Consortium PI: Elisa H. Barney Smith	January 2013 – December 2013 \$5,000
<u>ISGC NASA– Microgravity University</u> NASA Idaho Space Grants Consortium (2 grants) PI: Elisa H. Barney Smith	January 2013 – July 2013 \$10,000
<u>OCR at Melville's Marginalia Online</u> OSHER Institute Co-PIs: Elisa H. Barney Smith and Steven Olsen-Smith	January 2012 – August 2012 \$4,000
<u>ISGC NASA– Microgravity University</u> NASA Idaho Space Grants Consortium (2 grants) PI: Elisa H. Barney Smith	January 2012 – July 2012 \$10,000
<u>Rip & Diff Image Quality Evaluation</u> Hewlett Packard, Printer and Laser Jet Division, Boise, ID PI: Elisa H. Barney Smith	April 2010 – August 2011 \$93,319
<u>IDR: Remote and Directive Electromagnetic Stimulation of Transport Mechanisms to Enhance</u> <u>Soil Remediation</u> NSF, IDR PI: Arvin Farid, Co-PIs: Elisa H. Barney Smith, Jim Browning	Sept. 2009 - August 2013 \$371,783

Selection of MRI specifications for 2D/3D registration based joint modeling Sept. 2008 - June 2009
NIH/Institute of Translational Health Sciences, University of Washington \$5,000
Co-PIs: Elisa H. Barney Smith & Lorrie Kelley

CT-T: Following the Paper Trail: Reliable Processing of Voting Records for Trustworthy Elections
September 2007 – August 2009
NSF, CyberTrust Program \$ 200,000 total, \$41,000 BSU
PI: Dan Lopresti (Lehigh Univ), Co-PIs: Elisa H. Barney Smith, George Nagy (RPI),
Christopher Borick (Muhlenberg College), Ziad Munson (Lehigh Univ)

Comparison of Document and Thumbnail Images July 2007 – August 2008
Hewlett Packard, Printer and Laser Jet Division, Boise, ID \$155,298
PI: Elisa H. Barney Smith, Co-Is: Tim Andersen & Nader Rafla

CAREER: Document Image Degradation Analysis July 2003 - June 2009
NSF, Faculty Early Development (CAREER) Program \$400,000
NSF, Research Experience for Undergraduates Supplements \$29,920
PI: Elisa H. Barney Smith

Staying on Course: A program to retain electrical engineering students July 2005 - June 2010
Semiconductor Industry Association (SIA), Stay Tech Program \$20,000
Co-PIs: Elisa H. Barney Smith & Pat Pyke

ISGC NASA Ambassadors Program – Mentoring of Engineering Freshman January 2006 – May 2006
NASA Idaho Space Grants Consortium \$1,332
PI: Elisa H. Barney Smith

CREU: Improving the Niblack Modified Local Adaptive Thresholding Technique
for Binarization of Degraded Images August 2005 - June 2006
Computing Research Association Committee on the Status of \$2,500
Women in Computing Research (CRA-W). Collaborative Research Experience
for Undergraduates in Computer Science and Engineering (CREU)
Co-PIs: Elisa H. Barney Smith & Tim Andersen

CREW: Using Style Information to Improve OCR Accuracy September 2003 - June 2004
Computing Research Association Committee on the Status of \$2,000
Women in Computing Research (CRA-W). Collaborative Research Experience
for Women in Undergraduate Computer Science and Engineering (CREW)
Co-PIs: Elisa H. Barney Smith & Tim Andersen

Rapid Reaction Telescope (RRT) for Detection and Analysis of Gamma Ray Bursts (GRBs)
5 grants June 2000-June 2003
NASA EPSCoR \$75,000
Idaho Space Grants Consortium \$15,000
PI: Elisa H. Barney Smith,
Co-Is: John Gardner, Daryl Macomb, Scott Smith (BSU), Henry Willmes (University of
Idaho)

Use of Character Features for Scanner Parameter Estimation
Faculty Research Grant Program, Boise State University July 2001-June 2002
PI: Elisa H. Barney Smith \$4,950

<u>Idaho Engineering Science Camp</u>	June 2001-May 2002
NASA Idaho Space Grants Consortium	\$5,000
PI: Elisa H. Barney Smith, Co-Is: Joseph Sener, Leandra Aburusa	
<u>Document Scanning Defect Analysis using Bilevel Image Features</u>	June 2000-May 2001
NSF-Idaho EPSCoR Faculty Startup Funds 2000	\$135,000
PI: Elisa H. Barney Smith	
<u>GE Faculty for the Future Junior Faculty Coupon</u>	April 2000-August 2002
General Electric	\$15,000
PI: Elisa H. Barney Smith	

AWARDS:

<u>2013 IEEE Region 6 Leadership and Professional Service Award</u>	February 2014
<u>2005 Faculty Recognition of the Year Student's Choice Award</u>	
Associated Students of BSU "Dr. Barney Smith's teaching methods are very unique. Her lectures are very interactive, everyone gets a chance to participate, whether they like it or not."	Jan 2006
<u>BSU Provost's Excellence in Advising Award</u> (first year of award)	Jan 2006
<u>BSU Faculty Research Associates Program</u>	Aug 2005 – May 2006
<u>2003 IEEE Regional Activities Board Leadership Award</u>	November 2003
<u>Faculty International Development Award</u> from BSU for study at Universität Lüneburg	June 2003
<u>Faculty for the Future Junior Faculty Coupon</u> from General Electric	April 2000
<u>Charles Close Doctoral Prize</u> from RPI	May 1999
<u>Faculty for the Future Fellowship</u> from General Electric	September 1996 & 1997
<u>Society of Photo-optical Instrumentation Engineers (SPIE) Scholarship</u>	April 1995
<u>Strategic Initiatives Fellowship</u> from RPI	September 1993
<u>NATO/SACLANT Centre Intern position</u> , LaSpezia, Italy	May-Aug 1993

PROFESSIONAL MEMBERSHIP:

- Institute Electrical and Electronic Engineers (IEEE)
 - Senior member.
 - Member of Computer, Signal Processing, and Education Societies.
 - Member of Pattern Analysis and Machine Intelligence Technical Committee.
- Society Photo-optical Instrumentation Engineers (SPIE)
 - Senior member
 - Electronic Imaging Technical Committee member.
- International Association of Pattern Recognition (IAPR)
 - Conferences and Meetings Committee (C&M), 2013-present

PROFESSIONAL ACTIVITIES

Member editorial board for International Journal on Document Analysis and Recognition, Springer Verlag , December 2007-present.

Member Standards Working Group WD 19751 Text & Line Image Quality, January 2006 – present.

Co-chair SPIE Document Recognition and Retrieval X, XI and XII, January 2003, 2004 and 2005, San Jose, CA.

Member program committee for SPIE Document Recognition and Retrieval VII, IX, XIII-XVIII, January 2001 - 2016, San Jose/San Francisco, CA.

Program chair for International Conference on Document Analysis and Recognition ICDAR 2013, August 2013, Washington DC, USA.

Member program committee for International Conference on Document Analysis and Recognition ICDAR 2017, 10-15 November 2017, Kyoto Japan, Area Chair

ICDAR 2015, 23-26 August 2015, Nancy France, Area Chair

ICDAR 2011, 18-21 September 2011, Beijing China.

ICDAR 2009, 26-29 July 2009, Barcelona, Spain.

ICDAR 2007, 23-26 September 2007, Curitiba, Brazil.

Member program committee for International Workshop on Document Image Analysis for Libraries DIAL 2006: 27-28 April 2006, Lyon, France.

DIAL 2004: 23-24 January 2004, Palo Alto, CA.

Member program committee for IEEE International Symposium on Computer-based Medical Systems CBMS 2008: 17-19 June 2008, Jyväskylä, Finland.

CBMS 2007: 20-22 June 2007, Maribor, Slovenia.

CBMS 2006: 22-23 June 2006, Salt Lake City, Utah, USA.

Member program committee for IAPR International Workshop on Document Analysis Systems

DAS 2016, 11-14 April 2016, Santorini, Greece

DAS 2014, 7-10 April 2014, Tours, France

DAS 2012, 27-29 March 2012, Gold Coast, Queensland, Australia

DAS 2010, 9-11 June 2010, Cambridge, MA, USA

Member program committee for IEEE International Workshop on the Electronic Document Management in an Enterprise Computing Environment (IEEE EDM 2006) October 2006, Hong Kong.

Research & product demonstration organizer for International Conference on Document Analysis and Recognition (ICDAR 2001), September 2001.

Reviewer for other assorted journals and conferences.

IEEE Member:

Chair, North-east area of Region 6 IEEE. January 2009-December 2013. Oversee 6 IEEE sections and 10 student branches in Idaho, Montana and Utah.

Chair, Boise Section IEEE, September 2001-August 2004. Membership levels and activity significantly increased during this time from 520 to 650 members. Two new society chapters and an affinity group were formed. Vice-chair from May 2006 – 2009.

2017 Graphical Units Operations Committee – committee on the global level of IEEE.

2017 IEEE Region 6 Educational Activities Chair.

2017 IEEE Educational Activities Section Educational Outreach Committee.

MentorNet Faculty Mentor. Mentor for PhD students in Engineering and Science. Mentored five students. 2004 – 2010.

Research Ambassador for Deutscher Akademischer Austausch Dienst (DAAD), 2015-present

RESEARCH STUDENTS SUPERVISED:

Masters Students Graduated

Roger Clements, MSE CompE, “Speedup of Optical Scanner Characterization System,” May 2003.

Margaret Norris, MSE EE, “Modeling of Toner Coverage in Laser Printers,” May 2004.

Hok Sum (Johnny) Yam, MS EE, “Estimating Degradation Model Parameters from Character Images,” December 2004.

Darin Dutson, MSE EE, “Image Alignment Method for Matching a Telescope Image with a Star Catalog,” May 2005.

Craig McGillivary, MS EE, “Quantifying Noise Effects In Bilevel Document Images,” December 2007.

Geng Zheng, MS EE, “Image Registration Using Phase Correlation,” December 2008.

Renu Ramanatha, MS CS "A Parallel Implementation for analysis of CT/Fluoroscopy image registration", December 2009.

Amy Winder, MS CS "Extending the Page Segmentation Algorithms of the Ocropus Document Layout Analysis System for Mixed-Layout Document Processing", August 2010.

Subramaniam Venkatraman, MS EE, “Degradation Specific OCR,” December 2010.

Nazia Sarang, MS CS, “Biomedical matching GUI development,” May 2012.

Thanh Tran, MS EE, “Simulation of Artificial Neural Network with Memristive Devices”, August 2012.

Adrian Rothenbuhler, MS EE, “A Memristor-Based Neuromorphic Computing Application”
December 2012.

Masters Students In-Progress

Aaron Burdin, MS EE, expected completion August 2015. Research field: Forensic OCR.

CJ Stanger, MS EE, expected completion December 2015. Research field: 3D Ultrasound imaging.

Kyle Straub, MS EE, expected completion December 2015. Research field: Learning algorithms for Neuromorphic Computing.

Post-doctoral researcher advised:

XiaoHui Qiu, March-October 2001. Now at Nanjing University of Posts and Telecommunications, Nanjing, China.

Also sat on many MS committees and supervised many undergraduates working on undergraduate research projects and Senior Design projects.