

Brendan J Babb

RECENT HIGHLIGHTS	<p>Invited to the White House Champions of Change on Open Data and Civic Hacking. 7/2013</p> <p>Filing a Provisional Patent at University of Alaska, Anchorage on Mars Rover Image Compression techniques. 7/2013</p>
SKILLS & ABILITIES	<p>Specializing in innovative research, Evolutionary Computation (EC), Graphical Processing Units (GPUs) programming, Matlab, parallel and distributed processing, modelling, simulation and optimization. I love learning new things, collaborating with others, borrowing techniques from disparate fields and applying them to a new field, improving and optimizing solutions.</p>
EXPERIENCE	<p>RESEARCH TECHNICAN, UNIVERSITY OF ALASKA, ANCHORAGE (NASA EPSCOR CONTRACT 2011-PRESENT)</p> <p>June 2008-Present</p> <p>Researching methods for improving Mars Rover image compression. Using Evolutionary Computation (EC) and Genetic Algorithms (GA) for evolving wavelet like transforms that reduce the file size while keeping the image quality the same or keeping the file size the same with better image quality. Collaborating with colleagues at the Jet Propulsion Laboratory to improve on their proprietary ICER image compression software written in C. Using Graphical Processing Units (GPUs) to speed up the Matlab code and run it in parallel for the EC experiments. Filing a provisional patent for UAA based on the improvements that we have made including 6% smaller files with the same image quality. Also worked on Satellite and CT images using the supercomputer in Fairbanks to speed up experiments.</p> <p>COMPLEX SYSTEMS TEACHING ASSISTANT, UNIVERSITY OF ALASKA, ANCHORAGE</p> <p>January 2013-May 2013</p> <p>Helped students with software programming for complex systems projects involving agent based modeling (ABM), brain computer interface projects, music similarity analysis, and complex networks.</p> <p>SOFTWARE DEVELOPER III, DESIGN PT</p> <p>April 2010 – March 2011</p> <p>Developed several quality software solutions based on client needs. Projects included a front end dashboard for project progress tracking, SOX audit analysis and preparation, web redesign for an accounting firm, and a Ruby on Rails student management system.</p>

INDEPENDENT RESEARCHER, AIR FORCE, UTICA, NY

July 2007 – May 2008

Researched improving image compression via evolving wavelet transforms using genetic algorithms and differential evolution. Wrote code in MATLAB using distributed processing on the UAF supercomputer. Improved upon the fingerprint image compression standard (25% less mean square error) and satellite images compression.

SENIOR DEVELOPER ANALYST, GCI

January 1995 – July 2007

Co-created the GCI intranet. Managed the creation of external commercial sites. Specialized in internal web database applications. Established the Content Management System and Sharepoint company sites. Created the first live Iditarod website in one week. Maintained and supported custom invoicing system for cable, Internet and mobile.

COMPUTER SCIENTIST, DB SOFTWARE AT BP EXPLORATION, ALASKA

November 1992– May 1994

Wrote back-end SQL calculations for large scale pipeline engineering database to track and predict corrosion in the pipeline. Automated migration and validation of data from Oracle to SYBASE for 4D front-end

DATA ANALYST, ALASKA ENERGY AUTHORITY

July 1991 – August 1992

Analyzed village energy use and possibility of alternate sources such as wind to increase fuel efficiency. Created color and 3-D graphical presentations with Mathematica to provide easier interpretation of energy data.

INDEPENDENT CONSULTANT, ADVANCED MICRO DEVICES

January 1990 – January 1991

Architectural design of a new Error Detection Correction (EDC) chip. Filed new EDC patent and continued filing process on four previous patents. (Patent 5751744 issued May 1998)

DESIGN AND APPLICATIONS ENGINEER, ADVANCED MICRO DEVICES, SUNNYVALE CA

August 1989 – December 1989

Evaluated current Error Detection Correction (EDC) part and developed new architectural and mathematical methods to modify the existing chip and to create a new chip. Filed four patents at AMD concerning EDC advances. (Patent 5251219 issued November 1993 and 5633882 issued May 1997).

EDUCATION

OREGON STATE UNIVERSITY, CORVALLIS, OR, MATHEMATICS, BACHELORS 1991 & MASTERS OF SCIENCE 1992

PATENTS & PUBLICATIONS

ATTACHED CV CONTAINS A LIST OF PATENTS AND OVER 20 PUBLICATIONS

AWARDS & HONORS

WHITE HOUSE CHAMPIONS OF CHANGE ON OPEN DATA AND CIVIC HACKING, JULY 2013

Invited to the White House event for my work helping organize civic hacking, hackathons, and several civic projects in Anchorage including a game to learn about a map of indigenous languages and peoples of Alaska. Participated in a round table discussion on how we complete civic hacking projects and make civic hacking more sustainable.

WHITE HOUSE CLEAN ENERGY ECONOMY FORUM, NOVEMBER 2009

Invited to participate in a national forum sponsored by the White House and the Department of Interior on the Clean Energy Economy; met Ken Salazar at his office.

VOLUNTEER WORK

ALASKA CENTER FOR THE ENVIRONMENT, JUNE 2004 –PRESENT

Active volunteer for ACE from 2004 to present. Joined the board of directors in 2009 and worked on the merger of ACE, ACA, and AYEA in 2011-2012. A member of the new board of directors.

MUNICIPALITY OF ANCHORAGE, AUGUST 2012 – PRESENT

Member of the Bicycle and Pedestrian Advisory Committee.

RENEWABLE ENERGY OF ALASKA PROJECT, MAY 2005 – PRESENT

Volunteer at the Renewable Energy Fair, Business of Clean Energy Conference and various other events.

REBOOT ALASKA – NATIONAL DAY OF CIVIC HACKING, JUNE 2013

Organized Anchorage event showcasing current government applications and applications utilizing open data at the Loussac Library as one of 83 cities across the US. Over 11,000 people took part across the US in civic hacking and open data that weekend.

HACKATHON, MINI MAKER FAIRE ORGANIZER, JUNE 2012 – PRESENT

Part of a team that won the first hackathon in June of 2012 for a project to put People Mover data into Google Maps transit. Helped organize the hackathons in April and August of 2013 and the Mini Maker Faire in July. Member of the Code for America Brigade and a team member of Anchorage Adopt-a-hydrant that won a national competition for community involvement. Gave an Anchorage TEDx talk on Crowd Sourcing and Civic Hacking in March 2013.

LEAD NORTH ADVISORY COUNCIL MEMBER, DECEMBER 2011 – JULY 2013

Brendan J. Babb

Patents and Provisional Patents:

- [1] US Provisional Patent Filing, B. J. Babb and F. Moore, "Provisional Patent on Mars Rover Image Compression.", 2013.
- [2] US Patent 5,751,744, B. J. Babb, "Error detection and correction circuit.", 1998.
- [3] European Patent 0,527,025, B. J. Babb and S. B. Sidman, "Error detection and correction circuit.", 1997.
- [4] US Patent 5,633,882, B. J. Babb and S. B. Sidman, "Circuit and method of error detection and correction in data words with checkbits.", 1996.
- [5] US Patent 5,251,259, B. J. Babb, "Error detection and correction circuit.", 1993.

Publications:

2013

- [1] B. J. Babb and F. W. Moore, "Achieving equal image quality at lower bit rates using evolved image reconstruction transforms," in *IS&T/SPIE Electronic Imaging*, 2013, p. 86600R–86600R.

2012

- [2] B. Babb, F. Moore, S. Aldridge, and M. R. Peterson, "State-of-the-art lossy compression of Martian images via the CMA-ES evolution strategy," in *IS&T/SPIE Electronic Imaging*, 2012, p. 83050U–83050U.
- [3] F. Moore and B. Babb, "Evolved multiresolution analysis transforms improve lossy compression of Mars images," *IASTED Int. Conf. Signal and Image Proc.*, 2012.

2011

- [4] S. Aldridge, B. Babb, F. Moore, and M. R. Peterson, "Improved reconstruction of deep space images via genetic algorithms," in *Evolutionary Computation (CEC), 2011 IEEE Congress on*, 2011, pp. 102–109.
- [5] B. Babb, F. Moore, S. Aldridge, and M. R. Peterson, "Evolving wavelet and scaling numbers for optimized image compression: forward, inverse, or both? A comparative study," *Evolutionary and Bio-Inspired Computation: Theory and Applications V, Proc. SPIE Intl. Defense and Security Symp.*, 2011.
- [6] C. Miller, B. Babb, F. Moore, and M. Peterson, "Evolving improved transforms for reconstruction of quantized ultrasound images," in *Applications of Computer Vision (WACV), 2011 IEEE Workshop on*, 2011, pp. 256–261.
- [7] C. Miller, F. Moore, B. Babb, and M. R. Peterson, "Improved reconstruction of quantized CT scans via genetic algorithms," in *Evolutionary Computation (CEC), 2011 IEEE Congress on*, 2011, pp. 2293–2299.
- [8] F. Moore, B. Babb, S. Aldridge, and M. R. Peterson, "Evolving matched forward and inverse transforms for improved lossy compression of images from Mars," in *Systems, Man, and Cybernetics (SMC), 2011 IEEE International Conference on*, 2011, pp. 484–489.

2010

- [9] S. Aldridge, B. Babb, F. Moore, and M. R. Peterson, "Improved lossy compression of deep space images via genetic algorithms," 2010.
- [10] S. Aldridge, B. Babb, F. Moore, and M. Peterson, "Evolved image compression transforms," in *SPIE Defense, Security, and Sensing*, 2010, p. 77040C–77040C.
- [11] B. J. Babb, "Can evolved forward transforms do better than wavelets," in *Proceedings of the 12th annual conference companion on Genetic and evolutionary computation*, 2010, pp. 2043–2046.
- 2009
- [12] B. J. Babb, F. W. Moore, and M. R. Peterson, "Improved multiresolution analysis transforms for satellite image compression and reconstruction using evolution strategies," in *Proceedings of the 11th Annual Conference Companion on Genetic and Evolutionary Computation Conference: Late Breaking Papers*, 2009, pp. 2547–2552.
- [13] B. Babb, F. Moore, and M. Peterson, "Optimized satellite image compression and reconstruction via evolution strategies," in *SPIE Defense, Security, and Sensing*, 2009, p. 734700–734700.
- [14] F. Moore, B. Babb, M. Peterson, and G. Lamont, "Evolved transforms improve image compression," *SPIE Newsroom*, February, 2009.
- 2008
- [15] B. Babb, F. Moore, M. Peterson, and G. Lamont, "Evolving better satellite image compression and reconstruction transforms," in *Proceedings of the 2008 GECCO conference companion on Genetic and evolutionary computation*, 2008, pp. 1901–1906.
- [16] B. Babb, F. Moore, M. Peterson, and G. Lamont, "Improved satellite image compression and reconstruction via genetic algorithms," in *SPIE Europe Security and Defence*, 2008, p. 711405.
- [17] F. W. Moore and B. Babb, "A differential evolution algorithm for optimizing signal compression and reconstruction transforms," in *Proceedings of the 2008 GECCO conference companion on Genetic and evolutionary computation*, 2008, pp. 1907–1912.
- 2007
- [18] B. J. Babb, "Evolved transforms surpass the FBI wavelet for improved fingerprint compression and reconstruction," in *Proceedings of the 2007 GECCO conference companion on Genetic and evolutionary computation*, 2007, pp. 2603–2606.
- [19] B. J. Babb, F. W. Moore, and P. Marshall, "Evolved Multiresolution Analysis Transforms for Improved Image Compression and Reconstruction under Quantization," in *Computational Intelligence in Image and Signal Processing, 2007. CIISP 2007. IEEE Symposium on*, 2007, pp. 202–207.
- [20] B. Babb and F. Moore, "The best fingerprint compression standard yet," in *Systems, Man and Cybernetics, 2007. ISIC. IEEE International Conference on*, 2007, pp. 2911–2916.
- [21] B. Babb, F. Moore, and M. Peterson, "Evolved transforms beat the FBI wavelet for improved fingerprint compression and reconstruction," *6th WSEAS International Conference on Telecommunications and Informatics/6th WSEAS International Conference on Signal Processing*, pp. 179–184, 2007.

- [22] M. R. Peterson, G. B. Lamont, F. Moore, and B. Babb, "Variation operator performance for evolved image reconstruction transforms," in *Systems, Man and Cybernetics, 2007. ISIC. IEEE International Conference on, 2007*, pp. 2917–2922.

2006

- [23] B. J. Babb, "Evolving Optimized Forward and Reverse Transforms using Genetic Algorithms on a Supercomputer," 2006.
- [24] F. Moore and B. Babb, "Revolutionary image compression and reconstruction via evolutionary computation," *WSEAS Transactions on Signal Processing*, vol. 2, no. 9, pp. 1203–1208, 2006.
- [25] F. W. Moore and B. J. Babb, "Evolved transforms for improved image compression and reconstruction under quantization," in *Proceedings of the 6th WSEAS International Conference on Signal, Speech and Image Processing*, 2006, pp. 127–134.
- [26] F. Moore and B. Babb, "Revolutionary image compression and reconstruction via evolutionary computation, part 2: multiresolution analysis transforms," *WSEAS Transactions on Signal Processing*, vol. 2, no. 9, pp. 1209–1214, 2006.

2005

- [27] B. Babb, S. Becke, and F. Moore, "Evolving optimized matched forward and inverse transform pairs via genetic algorithms," in *Circuits and Systems, 2005. 48th Midwest Symposium on, 2005*, pp. 1055–1058.
- [28] F. Moore, B. Babb, S. Becke, H. Koyuk, E. Lamson III, and C. Wedge, "Genetic Algorithms Evolve Optimized Transforms for Signal Processing Applications," 2005.