

MARK D. LEBLANC

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Educational Background

- Ph.D.** Systems Design Engineering, University of New Hampshire, Durham.
Thesis title: *A Cognitive Model of "Mathematical Reading"*
- M.S.** Computer Science, University of New Hampshire, Durham.
- B.A.** Computer Science, University of Maine, Orono.

Employment History

Professor of Computer Science July 2004 to present.

Department of Computer Science, Wheaton College, Norton, MA.

Co-Chair Department of Math and Computer Science July 2015 to 2017.

Meneely Professor of Computer Science Wheaton College 2010 to 2015.

Visiting Fellow of Computer Science University of Wollongong, Australia, July 2004 to July 2005.

Associate Professor of Computer Science Wheaton College, June, 1998 to June, 2004.

Department Chair Mathematics & Computer Science, 1996-97, 1998-1999, 2000-2001, and 2002-2003.

Software Engineer Foxboro Company, June, 1999 to Sept. 2000 during full-year sabbatical.

Assistant Professor of Computer Science Wheaton College, July, 1993 to June, 1998.

Software Engineer ITEK Optical Systems, Lexington, MA June, 1984 to August, 1985.

Projects at a Glance

Lexomics Research Group – 2007 to present

An interdisciplinary research team of faculty and undergraduates including a software team focused on the design and implementation of a suite of online tools to introduce text mining of digitized texts. Current development on Lexos v3.1 (2018) is the result of ten summers of undergraduates with professors and visiting scholars, funded by the NEH and Wheaton College.

Online Tool: <http://lexos.wheatoncollege.edu>

Software: <https://github.com/WheatonCS/Lexos>

Research group: <http://lexomics.wheatoncollege.edu>

Genomics Research Group -- 1998 to present

This interdisciplinary, faculty-student research team of computer scientists, biologists, and statisticians used a linguistic metaphor to guide the work of merging computational and visualization approaches to the problem of discovering and deciphering the grammar and syntax of gene regulation and microbial evolution. Our undergraduates write experimental software (Python, bash, R) and apply machine learning tools, e.g., in conjunction with a local database of microbial genomes to apply techniques of genomic signature to open questions in comparative genomics. Previous efforts include a web-based "DNA dictionary" or motif lexicon (based on the online Oxford English Dictionary) and a "favGene" tool that allowed researchers to query the DNA sequences in regions near their favorite collections of genes. Recent work with a group of six bioinformatics students and a colleague in biology is exploring RefSeq data.

<http://genomics.wheatoncollege.edu>

Scholarship in the Queue

Software

Lexos: An Integrated Lexomics Workflow – an online toolkit to facilitate text mining experiments, including “scrubbing” (cleaning) and segmenting texts, clustering, and other analyses

Online Tool: <http://lexos.wheatoncollege.edu>

Software: <https://github.com/WheatonCS/Lexos>

Research with Undergraduates

Feng, W. and LeBlanc, M.D. (in press). Top-10 Suggestions from a Decade of Managing Undergraduate Software Teams. *The Journal of Computing Sciences in College*. Also to be presented at the Consortium for Computing Sciences in Colleges, University of New Haven, CT, April 12, 2019.

Recent presentations and workshops:

“Undergraduate research and Lexos” at Johnson C. Smith University in Charlotte, NC at their Summer Institute in the Interdisciplinary Humanities in June 2018.

“Working with Lexos – a hands-on workshop for faculty” at Endicott College’s Critical Thinking and Digital Technology Summer Institute in May 2018.

“Experiments in Digital Scholarship: Project-Based Learning at Wheaton College” at Susquehanna University in Selinsgrove, PA in March 2018 at their Center for Teaching and Learning and “Lexomics: Blending start-up and research cultures across the academy” to English, Math, and Computer Science faculty.

eBook:

LeBlanc, M.D. and LeBlanc, J.M. (2018). *From Maine to France and Somehow Back Again: The Great War Experiences of John M. Longley and the 26th Yankee Division*. Lulu Publishing. The eBook contains maps linked to Google maps and audio links to Vimeo.com featuring my late maternal grandfather talking of his experiences in France, one-hundred years ago during WWI. <http://www.lulu.com/spotlight/mleblanc>

Funding

External

January 01 – December 31, 2019: Council of Independent Colleges (CIC). (Co-PI with Kate Boylan, Wheaton College). “MyShelf: Workflows for curating and sharing digital scholarship on JSTOR Forum”.

May 01, 2015 – July 1, 2017: National Endowment for the Humanities – DH-SUG HD-228732-15 (PI with Co-PIs Mike Drout, English, Wheaton College and Scott Kleinman, California State University, Northridge). “Easing Entry and Improving Access to Computer-Assisted Text Analysis for the Humanities.”

April 01, 2011 – March 30, 2014: National Endowment for the Humanities – NEH PR-50112011 (Co-PI with Mike Drout (PI), English and Mike Kahn (Co-PI), Statistics, Wheaton College). “Lexomic Tools and Methods for Textual Analysis: Providing Deep Access to Digitized Texts.”

July 01, 2008 – June 30, 2010: National Endowment for the Humanities – NEH HD-50300-08 (PI with Co-PIs Mike Drout, English and Mike Kahn, Statistics, Wheaton College) “Pattern Recognition through Computational Stylistics: Old English and Beyond.”

May 2004 – May 2007: NSF DUE 0340761 (Co-PI with Betsey Dyer, Biology, Wheaton College). “Teaching Genomics to Undergraduate Computer Science and Biology Majors: A model involving infusion and strategic linking.”

Sept 2003 – May 2004: SIGCSE Special Projects Grant (Co-PI with Matt DeJongh, Hope College, MI). “Course Materials and Teaching Models for Bioinformatics.”

Jan 2002 – June 2003: NSF DUE 0126643 (Co-PI with Betsey Dyer, Biology, Wheaton College). “Two Workshops for Professors teaching Undergraduate Biology or Computer Science with an interest in incorporating ‘Genomics’ (the analysis of DNA sequences) into their curricula.”

Publications

Research

- Feng, W. '19 and LeBlanc, M.D. (in press). Top-10 Suggestions from a Decade of Managing Undergraduate Software Teams. *The Journal of Computing Sciences in College*.
- LeBlanc, M.D. and LeBlanc, J.M. (2018). *From Maine to France and Somehow Back Again: WWI Experiences of John M. Longley and the 26th 'Yankee' Division*. Lulu Publishing. [<http://www.lulu.com/spotlight/mleblanc>]
- Zhang, C. '18, de Landaluce, A. '17, Feng, W. '19, Steffens, E. '18, Kleinman, and LeBlanc (2018). Lexos 2017: Building Reliable Software in Python. *The Journal of Computing Sciences in College*, v33(6), 124-134.
- LeBlanc, M.D. (2017). Toward Reproducibility in DH Experiments: A Case Study in Search of Edgar Allan Poe's First Published Work. Short paper at Digital Humanities 2017, Montreal, Canada, August 9, 2017 <https://dh2017.adho.org/abstracts/027/027.pdf>.
- Boyd, P. '12, Drout, M.D.C., Hitotsubashi, N. '13, Kahn, M., LeBlanc, M.D. and Smith, L. '14 (2014). "Lexomic Analysis of Anglo-Saxon Prose: Establishing Controls with the Old English Penitential and the Old English translation of Orosius." *Revista de la Sociedad Española de Lengua y Literatura Inglesa Medieval (SELIM)*, 19, 7-58.
- Downey, S.J., Drout, M.D.C., Kahn, M.J. and LeBlanc, M.D. (2012). 'Books Tell Us:' Lexomic and Traditional Evidence for the Sources of *Guthlac A*. *Modern Philology*, 110: 1-29.
- Drout, M.D.C., Kahn, M.J., LeBlanc, M.D., and Nelson, C. '11 (2011). Of Dendrogrammatology: Lexomic Methods for Analyzing the Relationships Among Old English Poems. *Journal of English and Germanic Philology*, July 2011, 301-336. <http://muse.jhu.edu/article/446221>
- Drout, M.D.C., Kahn, M., LeBlanc, M.D., Jones, A. '11, Kathok, N. '10, and Nelson, C. '11 (2010). Lexomics for Anglo-Saxon Literature. *Old English Newsletter*.
- Dyer, B.D., Kahn, M.J., and LeBlanc, M.D. (2007). Classification and regression tree (CART) analyses of genomic signatures reveal sets of tetramers that discriminate temperature optima of archaea and bacteria. *Archaea* 2:159-167.
- Russell, S.W. and LeBlanc, M.D. (2004). Learning By Seeing By Doing: Arithmetic Word Problems. *The Journal of the Learning Sciences*, v13 (2), 197-220.
- Dyer, B.D., LeBlanc, M.D., Benz, S. '05, Cahalan, P.'04, Donorfio, B.'04, Sagui, P. '04, Villa, A.'03, and Williams, G. '03 (2004). A DNA motif lexicon: cataloguing and annotating sequences. *In Silico Biology*, v4, 0039. 471-478.
- LeBlanc, M.D. (2004). favGene v2.0 -- A Tool for Extracting and Searching Upstream, Downstream, and Genic Regions of DNA for Your "Favorite Genes". Abstract published in the Proceedings of the International Conference on Bioinformatics, Auckland, New Zealand.
- LeBlanc, M.D., Baron, M., Christoforou, A. '01, Doolittle, N. '03, Kimball, M. '02, Villa, A. '03, Williams, G. '02, and Dyer, B. (2002). The DNA Motif Lexicon -- cataloguing and annotating genomes. Abstract published in the Proceedings of the 14th International Genome Sequencing and Analysis Conference (TIGR), p92.
- LeBlanc, M.D., Aspeslagh, G. '00, Buggia N. '01, and Dyer, B.D. (2000). An annotated catalogue of inverted repeats of *Caenorhabditis elegans* Chromosome III with observations concerning odd/even biases and conserved motifs, *Genome Research*, v10(9): 1381-1392.
- LeBlanc, M.D. and Weber-Russell, S. (1996). Text integration and mathematical connections: a computer model of arithmetic word problem solving. *Cognitive Science*, v20(3), 357-407, 1996.
- LeBlanc, M.D. (1992). From natural language to mathematical representations: a model of mathematical reading. In *Mathematical Intelligent Learning Environments*, Nwana, H.C. (Ed.), Intellect Press, 1992. Also appears in a Special Issue of *Intelligent Tutoring Media*, v2(3-4), 149-158, 1991.

Publications continued

Pedagogy**Book**

LeBlanc, M.D. and Dyer, B.D. (2007). *Perl for Exploring DNA*. Oxford University Press.

Papers

Boese, E.S., LeBlanc, M.D., and Quinn, B.A. (2017). EngageCSEdu: Making interdisciplinary connections to engage students. *ACM Inroads*, v8(2), 33-36.

https://www.ncwit.org/sites/default/files/file_type/making_interdisciplinary_connections_to_engage_students.pdf

LeBlanc, M.D. (2016). Computing and the Digital Humanities. An NCWIT Teaching Paper: National Center for Women & Information Technology. Published sets of course materials for the “Computing for Poets” course.

http://www.engage-csedu.org/sites/default/files/LeBlanc_EngageCSEdu-TeachingPaper.pdf

LeBlanc, M.D. and Drout, M.D.C. (June 2, 2015). “DNA and 普通話 (Mandarin): Bringing introductory programming to the Life Sciences and Digital Humanities. *Procedia Computer Science: International Conference on Computational Science*, 51, 1937-1946.

<http://www.sciencedirect.com/science/article/pii/S1877050915012661>

LeBlanc, M.D., Drout, M.D.C., Kahn, M., Herbert, A. '14, Neal, R. '14 (2013). “Lexomics: Integrating the research and teaching spaces.” Short paper published in proceedings of *Digital Humanities 2013*, University of Nebraska–Lincoln, July 18, 2013.

Maloney, M., Parker, J., LeBlanc, M.D., Woodard, C.T., Glackin, M., and Hanrahan, M. (2010). Bioinformatics and the Undergraduate Curriculum *CBE Life Sci Educ*: 172–174.

LeBlanc, M.D., Gousie, M. and Armstrong, T. (March 2010). Connecting Across Campus. *Proceedings of the 41st SIGCSE Technical Symposium on Computer Science Education*, Milwaukee, WI., 52-56.

LeBlanc, M.D. and Leibowitz, R. (2006). Discrete Partnership – A case for a full-year of Discrete Math. Proceedings of the 37th SIGCSE Technical Symposium on Computer Science Education, Houston, TX, 313-317.

LeBlanc, M.D. and Dyer, B.D. (2004). Bioinformatics and Computing Curricula 2001 -- Why Computer Science is well positioned in a post-genomic world. *ACM SIGCSE Bulletin*, v36 (4), Dec. 2004, 64-67.

Benz, S.'04, Grossman, R.'07, Dyer, B.D., and LeBlanc, M.D. (2004). Genomics Research and the Liberal Arts: Building a Database for Exploring Your Favorite Set of Genes (favGene v2.0). *Transformations-Liberal Arts in the Digital Age*, v2 (1), May 2004.

LeBlanc, M.D. (2004). Bioinformatics in the Undergraduate Curriculum: Opportunities for Computer Science Educators. Abstract appears in the *Proceedings of the 35th SIGCSE Technical Symposium on Computer Science Education*. ACM Press, 229-230.

LeBlanc, M.D. and Dyer, B.D. (2003). Teaching together: A three-year case study in genomics. *The Journal of Computing Sciences in Colleges*, v18 (5), 85-95. This paper won the Best Paper Award for 2003.

Dyer, B.D. and LeBlanc, M.D. (2002). Meeting Report: Incorporating Genomics Research into Undergraduate Curricula. *Cell Biology Education*, Winter Issue, 2002, 101-104.

LeBlanc, M.D. and Dyer, B. (2002). Collaborations in Genomics - Connecting Courses in Genetics and Computer Science. Published in the workshop proceedings of *BIO 2010: Undergraduate Biology Education to Prepare Research Scientists for the 21st Century*, American Society of Cell Biology, 29-44.

LeBlanc, M.D. and Baron, G. (1999). Service learning in computing. *The Journal of Computing in Small Colleges*, v14 (4): 173-181. This paper won the Best Paper Award for 1999.

LeBlanc, M.D. (1996). Breadth += depth; Augmenting breadth in CS1 and CS2 with in-depth projects published on the Web. *The Journal of Computing in Small Colleges*, v11 (4), 109-116, May 1996.

Workshops

Experiments in Digital Scholarship: Project-Based Learning at Wheaton College at Susquehanna University in Selinsgrove, PA on March 2018 at their Center for Teaching and Learning.

Introducing Students to Explorations of Digitized Texts, Bucknell University Digital Scholarship Conference 2017, Oct. 6-8 2017.

Bringing Computational Thinking to the Digital Humanities: Introducing Students to Explorations of Digitized Texts, CCSCNE 2017 the College of Saint Rose, Albany, NY, April 7, 2017.

Using Lexos to Explore your Digital Texts, NEMLA 2017, Baltimore, MD, March 23, 2017

Lexos: Easing Entry to Computational Studies with Digitized Texts, Coffee and Code Series, Boston College Libraries, O'Neill Library, Digital Studio March 20, 2017.

Drout, M.D.C., LeBlanc, M.D., Neal, R. '14, Berger, R. '14, Hitotsubashi, N. '13, Smith, L. '14. (2013). Graduate Workshop: Using Lexomics Tools. Presented at the *International Society of Anglo-Saxonists (ISAS 2013)*, Dublin, Ireland, July 28, 2013.

"Lexomics Methods" – Presented at *The 47th International Congress on Medieval Studies*, Kalamazoo, MI, May 10, 2012.

Perl for Biologists. Howard Hughes funded workshop for retaining students in science. Hampton College, VA, 2010, 2011, 2012.

Perl for Biologists. Howard Hughes funded workshop for retaining students in science. Hampton College, VA, June 27-30, 2010.

Palindromes in DNA Land. Presented at 'DNA and Health: Education, Community and Business Perspectives' (with B. Dyer) at the Center for the Advancement of Science Exploration, Bridgewater State College, February 5, 2009.

Alice in High School Land. Presented a hands-on introduction to the Alice programming environment to computing and mathematics teachers at Norton Public High School, Norton, MA, February 1, 2009.

Extremophiles and Spider Webs: Adventures in Genomics. Presented at 'Bringing Big Science to Small Schools: Genomics Curriculum Development Workshop' (with B. Dyer) at Vassar College, July 22, 2007.

Travels in "DNA Land – Approaching DNA sequence analysis with word play. Presented with Betsey Dyer (Biology, Wheaton College) at the 38th SIGCSE Technical Symposium on Computer Science Education, Covington, KY, March 9, 2007.

Regular Expressions and DNA. Presented with Betsey Dyer (Biology, Wheaton College) at the National Institute for Technology and Liberal Education (NITLE) Bioinformatics Practicum (with B. Dyer), Bates College, June 20, 2006.

Travels in "DNA Land – Approaching DNA sequence analysis with word play. Presented with Betsey Dyer (Biology, Wheaton College) at the 37th SIGCSE Technical Symposium on Computer Science Education, Houston, TX, March 3, 2006.

Travels in "DNA Land" -- Approaching DNA Sequence Analysis Through Word Play. Presented with Betsey Dyer (Biology, Wheaton College) at the Consortium for Computing in Colleges Eastern Conference, Iona College, Iona, NY, Oct. 10, 2005.

Exploring DNA Land with Regular Expressions. Presented at Geospiza's "Bio21: Teaching Biology with Bioinformatics" with Betsey Dyer, Research Triangle Park, NC, Oct. 17-18, 2003.

Moving Research to the Classroom: Linking courses in Biology and Computer Science. Presented at a two-day short course on "Reading the Book of Life: How Bioinformatics Makes Sense of Molecular Messages", MathFest 2003, Boulder, CO, July 29-30, 2003.

Workshops continued

Two Workshops for Professors teaching Undergraduate Biology or Computer Science with an interest in incorporating Genomics (the analysis of DNA sequences) into their curricula. (NSF DUE #0126643), Wheaton College, Norton, MA June 2002 and June 2003.

Genomics in the Undergraduate Curriculum. Presented at “Bioinformatics in the Undergraduate Curriculum”, with Betsey Dyer. Dickinson College, Carlisle PA, March 21-22, 2003.

Collaborations in Genomics - Connecting Courses in Genetics and Computer Science. Presented at the workshop “New Paradigms in Teaching Introductory and Cell Biology” at the 42nd Annual Meeting of the American Society for Cell Biology, with Betsey Dyer, San Francisco, CA, December 14, 2002.

Conference and Invited Presentations

[Lexos 2017: Building Reliable Software in Python](#). Annual Conference of the Consortium of Computing Sciences in Colleges, University of New Hampshire – Manchester, Manchester, NH, April 13, 2018.

From coding to curating: a decade of building tools for close reading of digitized texts (with Kate Boylan, Wheaton College). Bucknell University Digital Scholarship Conference 2017, Oct. 6-8 2017.

Toward Reproducibility in DH Experiments: A Case Study in Search of Edgar Allan Poe’s First Published Work, Digital Humanities 2017, Montreal, Canada, August 9, 2017.

Using *Lexos* to Mine Medieval Texts: The Lexomic Workflow. Presented at *Digital Britain: New Approaches to the Early Middle Ages*, March 25, 2016, Harvard University, Cambridge, MA.

Using Research Projects to Promote Information Fluency. Presented at The Council of Independent Colleges *Information Fluency in the Disciplines: Workshop on English and American Language and Literature*, March 10-12, 2016, Louisville, KY with M. Drout and J. Lund.

Exploring Digitized Texts: the Digital Humanities as Makers. Presented at Denison University, Granville, OH, September 10, 2015.

DNA and 普通话 (Mandarin): Bringing introductory programming to the Life Sciences and Digital Humanities. *International Conference on Computational Science*, Reykjavik, Iceland, June 2, 2015.

The Natural Variability of Inverted Repeats in the Human Microbiome. Experimental work performed in conjunction with B. Dyer, C. DeMolles ’13, and M. Li ’14. Abstract published in the proceedings of and work presented at BIT’s 4th *World DNA and Genome Day*, Nanjing, China, April 25, 2013.

Classifying Stages of Retention and Loss of DNA Acquired by Horizontal Transfer between Bacteria and Archaea. Experimental work performed in conjunction with E. Baldwin ’13, K. Hichens ’13, M. Kahn, and B. Dyer. Abstract published in the proceedings of and work presented at BIT’s 3rd *World DNA Day*, Xi’an, China, April 26, 2012.

Computer Science @Home: Programming with Alice Animation. Presented at the Massachusetts Home School Convention. Worcester, MA, April 30, 2011.

Bioinformatics in the computer science curriculum. Panel presentation at CCSCNE 2011 -- Conference for Computing in Small Colleges. Western New England College, Springfield, MA, April 16, 2011.

Recruiting via a First-Year Seminar: Storytelling Through Computer Animation. Presented at SIGCSE 2011 -- The Technical Symposium on Computer Science Education, Dallas, TX, March 11, 2011.

medPing: Data Structures with Embedded Medical Devices. Presented at CCSCNE 2010 – Conference for Computing in Small Colleges. Hartford, CT, April 16, 2010.

Presentations continued

- Computer Science @Home: Programming with Alice Animation. Presented at the Massachusetts Home School Convention. Worcester, MA, April 24, 2010.
- Connecting Across Campus. Presented at SIGCSE 2010 – The Technical Symposium on Computer Science Education, Milwaukee, WI, March 11, 2010.
- Computing for Poets. Presented at SIGCSE 2010 – The Technical Symposium on Computer Science Education, Milwaukee, WI, March 12, 2010.
- Fishing for patterns in a sea of texts: Lexomics for Anglo-Saxon Literature. Presented at the International Society of Anglo-Saxonists (with M. Drout, M. Kahn, and C. Nelson '11) at St. John, Newfoundland, Canada, July 25, 2009.
- Horizontal Transfer: Across Disciplines and Genomes. Presented at Rhode Island College Computer Science Seminars (with B. Dyer and M. Kahn), Providence, RI, March 19, 2009.
- Bio Meets Big Oh: Turning Research into Programming Assignments. Poster presentation at SIGCSE 2008 – The Technical Symposium on Computer Science Education. Portland, OR, March 14, 2008.
- Extremophiles and Spider Webs: Adventures in Genomics. Keynote address at the National Institute for Technology and Liberal Education (NITLE) Bioinformatics Practicum (with B. Dyer), Bates College, July 19, 2007.
- If Darwin had Undergraduate Interns on the Beagle.... Keynote address at the National Institute for Technology and Liberal Education (NITLE) Bioinformatics Practicum (with B. Dyer), Bates College, June 19, 2006.
- Pals in DNA Land. Presented at Bridgewater State College (with R. Leibowitz). Sponsored by the Department of Mathematics. February 27, 2006.
- A Linguistic Analysis of Microbial Genomes. Presented at the University of New Hampshire (with B. Dyer). Sponsored by Department of Computer Science, Hubbard Genome Center, and the Department of Microbiology. February 23, 2006.
- Poets, Delta, and DNA: inferring prokaryotic relationships from non-coding regions. Presented at the Colby College Computer Science Seminar Series, Waterville, Maine, September 15, 2005.
- In silico* research in Bioinformatics -- Why computing is so well positioned in a post-genomic world. Address at the School of Information Technology and Computer Science Seminar Series, University of Wollongong, NSW, Australia, Feb. 18, 2005.
- favGene v2.0 -- A Tool for Extracting and Searching Upstream, Downstream, and Genic Regions of DNA for Your "Favorite Genes". Presented at the International Conference on Bioinformatics, Auckland, New Zealand, Sept. 6, 2004.
- Course Materials and Teaching Models for Bioinformatics. Presented at the National Technical Symposium on Computer Science Education, Norfolk, Virginia, March 4, 2004.
- Bioinformatics in the Undergraduate Curriculum: Opportunities for Computer Science Educators. Presented at the National Technical Symposium on Computer Science Education, Norfolk, Virginia, March 5, 2004.
- Towards a DNA Dictionary. The 42nd Annual Meeting of the American Society for Cell Biology with Benz, S. '05, Cool, J. '04, and Dyer, B., San Francisco, CA, December 16, 2002.
- The DNA Motif Lexicon -- cataloguing and annotating genomes. Presented at the 14th International Genome Sequencing and Analysis Conference (TIGR) with Baron, M. '03, Christoforou, A. '01, Doolittle, N. '03, Kimball, M. '02, Villa, A. '03, Williams, G. '02, and Dyer, B., October 4, 2002, Boston, MA.
- Genomics: Biology Meets Computer Science. Presented at the Association of American Colleges & Universities (AACU) Conference on Rethinking Scientific Literacy in an Age of Diversity and Specialization. Charlestown, SC, April 2000.

Presentations continued

Genomes and Computing -- From Homework to Research. Presented at MathFest'99 with Betsey Dyer, Providence, RI, July 1999.

Service Learning in Computing. Presented at the 1999 Northeastern Conference on Computing in Small Colleges, Providence, RI, April, 1999.

WebPals – a mathematics education tool, with Dana Breslau and Sylvia Weber-Russell. Presented at WebNet97 World Conference of the WWW, Internet, and Intranet. Association of Advancement of Computing in Education, Toronto, Canada, November, 1997.

Doing Their Own Math: Computer Support of Discursive Approaches to "Real" Math Problems, with Sylvia Weber-Russell. Presented at and published in the Proceedings of the Second International Conference on the Learning Sciences, Association of Advancement of Computing in Education, July, 1996, 324-331.

Making mathematical connections through natural language: a computer model of text comprehension in arithmetic word problem understanding, with Sylvia Weber-Russell. Presented at and published in the Proceedings of the 15th Annual Meeting of the Cognitive Science Society, Lawrence Erlbaum Associates, June, 1993, 641-646.

When more is less -- interactive tools for relational language. Presented at and published in the Proceedings of the 16th International Group of the Psychology of Mathematics Education, (abstract appears in volume 3, p. 171), Durham, NH, August, 1992.

Monitoring the role of linguistic processes in the comprehension of arithmetic word problems. Presented at and published in the Proceedings of the Third University of New Brunswick Artificial Intelligence Workshop, Fredericton, New Brunswick, Canada, October, 1990, 117-126.

Teaching

Wheaton College: Department of Computer Science. **July, 1993 - present.**

- Introduced two-hour, hands-on labs in introductory Computer Science courses (1993).
- Changed the introductory year in computer science from Pascal to C++ (1994).
- Upgraded the minor in Computer Studies to a minor in Computer Science (1995).
- Introduced a new major in Computer Science (1997).
- Included a service learning component into the computer science program; students work as one company for clients in the local town (e.g., Town Hall, Norton Historical Society).
- NSF funding for a new 20 workstation lab (Windows/Linux machines) (1998).
- Helped justify and secure two tenure track positions for additional computer scientists, 1998 and 2001.
- Developed a new discrete mathematics course for computer science majors (Spring 2003).
- Developed two new non-majors "connected" courses to satisfy the Quantitative Analysis requirement: "DNA" (Fall 2003, originally team-taught with a biologist) and "Computing for Poets" (Spring 2004).
- Established interdisciplinary "connections" with colleagues in the Humanities: 'Algorithms' and 'DNA' connected with Ethics (Philosophy); 'Computing for Poets' connected with 'Anglo-Saxon Literature' and 'Tolkien' (English), and 'Digital Humanities' (Hispanic Studies).
- Led computer science faculty to develop new suite of "initial courses" to broaden interest (2008).
- Experimenting with MOOCs for credit and student-driven, project-based courses (Fall 2012-present).
- Taught first-year seminars: "Storytelling with Google Maps" (four years) and "DNA" (Fall 2017).
- Helped secure additional fourth tenure-track line in computing (Fall 2017).

Wheaton course experiences

- New first-year seminar "DNA" merging computational genomics and personalized medicine (2017).
- Designed new course "Startup v1.0: Medical Devices, Mobile Apps, and Machine Learning" to encourage students to recognize their potential beyond the classroom (2016).
- Managed six faculty-student projects in our senior seminar, mapping students to projects pitched from Wheaton faculty from across the academy (2017).
- Led experimental course "Future Interactions" to expose students in computing to new hardware including Google Glass, Leap Motion, and Pebble watches (2013).
- Developed new first-year seminar "Storytelling with Google Maps" featuring the integration of writing with Google Earth Pro, Photoshop, iMovie, and iBook Author (2008-2011 and 2015).

Teaching continued

University of Wollongong, Australia, NSW: Department of IT and Computer Science. **2004-2005**.

- Visiting Fellow in Computer Science.
- Team-taught CSCI204/MCS9204 “Unix and the C Family”.

University of New Hampshire: Department of Computer Science. **1987-1993**.

- Scientific Programming with Numerical Methods. Fall 1991 - Spring 1993.
 - developed new service courses for the entire College of Engineering.
 - one of the first instructors to introduce C as the initial language for engineering students.

Student Scholarship

Undergraduate Honors Theses

Cluster Validation Using the Non-parametric Bootstrap and Parallel Processing: Applications in Unsupervised Machine Learning of Shimodaira's Method to Text Mining and Genomics. Donald Bass, May 2012. Co-advisor with Mike Kahn, Statistics.

diviText: Visualizing Text Segmentation for Text Mining. Amos Jones. May 2011.

The Politics of Free: Open Source Software in Government. Brian Donorfio. May 2004.

Giving DNA a Trie. Adam Villa. May 2003.

Search Algorithms for Locating Potential Regulatory Motifs in the Promoters of the Krebs Cycle Genes of *Caenorhabditis elegans*. Glen Aspeslagh, May, 2000.

Utilizing a Genetic Algorithm to Search the Structure-space of Artificial Neural Networks for Optimal Architectures. Ken Aspeslagh, May 2000.

Student Presentations and Publications

Zhang, C. '18, Feng, W. '19, Steffens, E. '18, and de Landaluce, A. '17. Lexos 2017: Building Reliable Software in Python. Paper presentation at the Northeast region of the Consortium for Computing Sciences in Colleges (*CCSCNE 2018*), Manchester, NH, April 13, 2018.

Devin Delfino '14, Bryan Jensen '15, Mengyang Li '14, Julia Morneau '16, and Richard Neal '14. Lexos: A Text Mining Workflow. Poster presentation at the Northeast region of the Consortium for Computing Sciences in Colleges (*CCSCNE 2014*), Providence College, Providence, RI, April 25, 2014. This work won 3rd place for best research.

Tongbo Sui '14. Graphical Visualization of Eye-Tracking Data. Poster presentation at the Northeast region of the Consortium for Computing Sciences in Colleges (*CCSCNE 2014*), Providence College, Providence, RI, April 25, 2014. Co-advised with Jason E. Reiss, Psychology, Wheaton College.

Taylor Wright-Sanson '13, Richard Neal '14, Clayton Rieck '14, Tri Nguyen '14, and Anthony Castellani '13. cowDuck: An iPhone App for the Wheaton College Community. Poster presentation at the Northeast region of the Consortium for Computing Sciences in Colleges (*CCSCNE 2013*), Siena College, Loudonville, NY, April 12, 2013. This work won 3rd place for best research.

Richard Neal '14. hyperCutter: Combining Discrete Lexomics Tools. Poster presentation at the Northeast region of the Consortium for Computing Sciences in Colleges (*CCSCNE 2013*), Siena College, Loudonville, NY, April 12, 2013.

Taylor Wright-Sanson '13. Circus Smirkus v1.0. Poster presentation at the Northeast region of the Consortium for Computing Sciences in Colleges (*CCSCNE 2013*), Siena College, Loudonville, NY, April 12, 2013.

Kelsey Hichens '13 and Emily Baldwin '13. The Double Helix of Computer Science and Biology: Horizontal Transfer in Archaea and Bacteria Genomes. Poster presentation at the Northeastern Consortium for Computing Sciences in Colleges (*CCSCNE 2012*), *Quinnipiac University*, Hamden, CT, April 27, 2012.

Student Presentations and Publications continued

- Jones, Amos '11. diviText: Graphical and Automated Text Segmentation for Text Mining. Poster presentation at the Northeastern Consortium for Computing Sciences in Colleges, Western New England College, April 15, 2011.
- Nelson, Christina '11, Drout, M., Kahn, M., and LeBlanc, M.D. Fishing for patterns in a sea of texts: Lexomics for Anglo-Saxon Literature. Presented at the International Society of Anglo-Saxonists at St. John, Newfoundland, Canada, July 25, 2009.
- Benz, Steve '05, Grossman, Robbie '07, Dyer, B.D., and LeBlanc, M.D. (2004). Genomics Research and the Liberal Arts: Building a Database for Exploring Your Favorite Set of Genes (favGene v2.0). *Transformations- Liberal Arts in the Digital Age*, v2 (1), May 2004.
- Benz, Steve '05 and Grossman, Robbie '07 (2004). FavGene 2.0 -- A Perl and MySQL System for Exploring a Set of Genes. Presented at the Northeastern Conference on Computing in Small Colleges, Union College, NY, April 2004. Abstract published in the *Journal of Computing Sciences in Colleges*, 311-312.
- Donorfio, Brian '04 (2004). The Politics of Free: Open Source Software in Government. Presented at the Northeastern Conference on Computing in Small Colleges, Union College, NY, April, 2004. Abstract published in the *Journal of Computing Sciences in Colleges*, 279-280.
- Benz, Steve '05 and Cool, Jonah '04 (2003). Using Regular Expressions to Locate Putative Zinc Finger Binding Sites. Presented at the Northeastern Conference on Computing in Small Colleges, Rhode Island College, RI, April 2003. Abstract published in the *Journal of Computing Sciences in Colleges*, v18(5), 254.
- Villa, A. '03 (2003). Searching DNA Neighborhoods. Presented at the Northeastern Conference on Computing in Small Colleges, Rhode Island College, RI, April 2003. Abstract published in the *Journal of Computing Sciences in Colleges*, v18 (5), 245.
- Christoforou, Andrea '01 (2001). Counting Problems in Genomics. Presented at the Northeastern Conference on Computing in Small Colleges, Middlebury, VT, April 2001. Abstract published in the *Journal of Computing Sciences in Colleges*, v16 (4), 343.
- Kimball, Melissa '02 (2001). A Motif Lexicon for the Genomic Analysis of DNA. Presented at the Northeastern Conference on Computing in Small Colleges, Middlebury, VT, April 2001. Abstract published in the *Journal of Computing Sciences in Colleges*, v16 (4), 344.
- Kim, Ruben '99 (1999). A Computational Experiment in Number Theory. Presented at the Northeastern Conference on Computing in Small Colleges, Providence, RI, April, 1999. Abstract published in the *Journal of Computing Sciences in Colleges*.
- Aspesslagh, Ken '00 and Pasquale, Matt '99 (1998). Cracking all night - Nocturnal execution and implementation of an encryption breaking application. Presented at the Northeastern Conference on Computing in Small Colleges, Sacred Heart University, Fairfield, CT, April, 1998. Abstract published in the *Journal of Computing Sciences in Colleges*.

Student Research Work

Summer 2018

Weiqi Feng '19, Phuntsho Norbu '19, Ginger Ciaburri '20, Abigail Cahill '20, Marissa Gamache '20, Danny Mullen '20, Eammon Littler '20, Yenny Bautista '19, Nina Treese '19, Jigme Sherpa '19, Mat LeBlanc '20, and Krissa Cusanelli '19. NEH and Wheaton funded research students. Lexos: An integrated workflow of text mining tools. <http://lexos.wheatoncollege.edu>.

Summer 2017

Alvaro de Landaluce '17, Joshua Wolfe '18, Emma Steffens '18, Weiqi Feng '19, Elizabeth Oliveira '18, Xinru Liu '19, Shi Shen '18, Cheng Zhang '18, Arianna Alfiero '19. NEH and Wheaton funded research students. Lexos: An integrated workflow of text mining tools. <http://lexos.wheatoncollege.edu>.

Student Research Work continued

Summer 2016

Yiging Cao '17, Jordan Hamilton '18, Michael Kristy '18, Evan Laferriere '18, Alvaro de Landaluce '18, Caren McCarthy '18, Kristina Reddy '17, Steven Waterhouse '17, Cheng Zhang '18. NEH and Wheaton funded research students. Lexos: An integrated workflow of text mining tools. <http://lexos.wheatoncollege.edu>.

Summer 2015

Jesse Aronson '17, Austin Gillis '16, Shiwei Huang '15, Jianxiang Lui '16, Caleb Wastler '17, Cheng Zhang '18, Qi Zhang '16. NEH and Wheaton funded research students. Lexos: An integrated workflow of text mining tools. <http://lexos.wheatoncollege.edu>.

Summer 2014

Richard Neal '14, Bryan Jensen '15, Jinnan Ge '16, Qi Zhang '16, Lithia Helmreich '17. Wheaton funded research students. Lexos: An integrated workflow of text mining tools. <http://lexos.wheatoncollege.edu>.

Summer 2013

Richard Neal '14, Bryan Jensen '15, Devin Delfino '15, Mengyang Li '14, and Julia Morneau '16. Wheaton and NEH-funded research students. Lexos: An integrated workflow of text mining tools. <http://lexos.wheatoncollege.edu>.

Academic year 2012-2013

Chris DeMolles '13 and Mengyang Li '14. Wheaton Research Partners for experiments leading to the presentation of results in World DNA Day in Nanjing, China: "The Natural Variability of Inverted Repeats in the Human Microbiome."

Summer 2012

Alicia Herbert '14 and Richard Neal '14. NEH grant research students. Online tools for scrubbing digitized texts and cluster analyses.

Summer 2011

Amos Jones '11 and Donald Bass '12. NEH grant research students. New tools for text mining experiments.

Academic year 2010-2011

Emily Baldwin '14 (Wheaton Research Partner).
Learning Perl for experiments in genomics.

Summer 2010

Amos Jones '11, Brandon Waltz '11, Matt Brousseau '11 (NEH-funded), Nick Faulconer '12, Donald Bass '12 (Mars Student Fellows).

Updated software to automatically re-seed our database of 700+ microbial genomes and set up experiments with genomic signatures to detect horizontal transfer.

Updated content with WordPress and ported websites for both the Genomics and Lexomics research groups.

Fall 2009

Christina Nelson '11 (Wheaton Research Partner).

Experimental support for two new publications on untangling the web of the Anglo-Saxon corpus.

Academic year 2008 – 2009

Christina Nelson '11 and Neil Kathok '10 (Wheaton Research Partners).

Designed and ran hundreds of experimental runs as we untangle the web of the Anglo-Saxon corpus.

Summer 2008

Neil Kathok '10, Christina Nelson '11, Amos Jones '11 (Mars Student Fellows).

Implemented software to automatically re-seed our database of 700+ microbial genomes.

Academic year 2007 – 2008

Evan Ferri '08, Matthew Brown '10, and Neil Kathok '10 (Wheaton Research Partner).

Experimented with models to determine if genomic signatures in plasmids are similar to the host genome.

Spring 2007

Neil Kathok '10 (Wheaton Research Partner).

Tested all Perl examples found in our book 'Perl for Exploring DNA' (Oxford).

Student Research Work continued**Summer 2006**

Greg Williams '06 (NSF Grant Intern).

Designed and seeded a mysql database to hold 300 microbial genomes and associated annotation.

Summer 2005

Robert Goodman '07 (NSF Grant Intern).

FavGene v2.1 – upgrading software, adding genomes, and running experiments.

July 2004 – July 2005

Paul White '05 (Research Fellow, University of Wollongong, Australia, NSW).

Development of a suite of software for experiments on over 200 prokaryotic genomes.

Fall 2003 to Spring 2005

Steve Benz '05., Robert Goodman '07, Nguni Phakela '06 (Wheaton Research Partners).

FavGene v2.0 – an application to search upstream and downstream of a user's suite of "favorite genes".

Summer 2003

Brian Donorfio '04 and Pete Cahalane '04. (Mars Research Fellows).

Motif Lexicon v3.0 – a complete upgrade of the "DNA dictionary" software.

January 2003

Greg Williams '03. Perl utilities for a Favorite Gene Project.

Summer 2002

Martin Baron '03 and Patrick Sagui '04. (Mars Research Fellows). Implementation of Relateds-module and porting Motif Lexicon v2.0 to new Linux/Win2K servers.

January 2002

Melissa Kimball '02 and Greg Williams '03 (Wheaton Research Partners)

Implementation of Statistics module and Etymology module for the Genomics Research Group website.

January 2001

Adam Villa '03, Nick Doolittle '03, Melissa Kimball '02 and Nathan Buggia '01.

Software team to implement what we believe is the first motif lexicon (DNA dictionary).

Summer 2000

Glen Aspeslagh '00 (Shouse Fellow) and Nathan Buggia '01 (Wheaton Fellowship)

January 1999

Melissa Kimball '02 and Trevor Agnitti '02. (Mars Research Fellows)

Undergraduates in computer science prototype a motif lexicon (DNA dictionary).

January 1998

Ken Aspeslagh '00 (Shouse Fellow)

Designed and programmed the graphical user interface for *eXpress Math* v2.0, Quincy Public School system.

Student Funding and Fellowships

Alvaro de Landaluce '17, Joshua Wolfe '18, Emma Steffens '18, Weiqi Feng '19, Xinru Liu '19, Shi Shen '18, Cheng Zhang '18, and Arianna Alfiero '19.

NEH and Wheaton funded research students.

Yiging Cao '17, Jordan Hamilton '18, Michael Kristy '18, Evan Laferriere '18,

Alvaro de Landaluce '18, Caren McCarthy '18, Kristina Reddy '17, Steven Waterhouse '17.

Mars, Wheaton, and Balfour Student Fellows for text mining software development

Jesse Aronson '17, Austin Gillis '16, Jingxian Liu '16, Caleb Wastler '17, and Qi Zhang '16.

Mars, Wheaton, and Balfour Student Fellows for text mining software development

Qi Zhang '16, Jinnan Ge '16, and Lithia Helmreich '16. Mars and Balfour Student Fellows for text mining software development

Richard Neal '14 and Bryan Jensen 16. NEH grant text mining software development.

Student Funding and Fellowships continued

- Julia Morneau '16, Devin Delfino, and Mengyang Li '14. Mars and Balfour Student Fellows for text mining software development
- Alicia Herbert '14 and Richard Neal '14. NEH grant text mining software development.
- Amos Jones '11 and Donald Bass '12. NEH grant text mining software development.
- Donald Bass '12 and Nick Faulconer '12 – Mars Student Fellows.
Genomics (horizontal transfer) experiments.
- Christina Nelson '11 – Wheaton Research Partner.
Lexomics (Old English) experiments.
- Christina Nelson '11 and Neil Kathok '10 – Wheaton Research Partners.
Lexomics (Old English) and genomics (horizontal transfer) experiments.
- Neil Kathok '10, Christina Nelson '11, Amos Jones '11 - Summer 2008 Mars Student Fellows.
NEH and *Wheaton Genomics Group* authorship attribution and genomics signature project.
- Neil Kathok '10 - 2007 Wheaton Research Partner.
Wheaton Genomics Group textbook project
- Steve Benz '05., Robert Goodman '07, Nguni Phakela '06 - 2003-2004 Wheaton Research Partners.
Wheaton Genomics Group FavGene v2.0
- Brian Donorfio '04 and Pete Cahalan '04 - 2003-2004 Mars Research Fellows.
Wheaton Genomics Group Motif Lexicon v3.0
- Stephen Benz '05 and Jonah Cool '04 - 2002-2003 Wheaton Research Partners.
Wheaton Genomics Group - Finding putative Zinc Finger regulatory sites.
- Martin Baron '03 and Patrick Sagui '04 - Summer 2002 Mars Research Fellows.
Wheaton Genomics Group - Motif Lexicon v2.0.
- Adam Villa '03, Nick Doolittle '03, Melissa Kimball '02 and Nathan Buggia '01 - Jan. 2001
Filene Research Fellows. *Wheaton Genomics Group* - software for motif lexicon.
- Melissa Kimball '02 and Trevor Agnitti '02 - Jan. 1999 Mars Research Fellows.
Wheaton Genomics Group - prototype of a motif lexicon.
- Nathan Buggia '01 - Jan. 1999 Wheaton Fellowship Program.
Wheaton Genomics Group - browse and search tools for DNA sequences
- David Dudek '01 - Jan. 1999 Wheaton Fellowship Program.
Disseminating course materials via the web
- Nathan Buggia '01- Jan. 1998 Wheaton Fellowship Program.
eXpress Math -- v2.1 Perl database
- Ken Aspeslagh, '00 - January 1997 Wheaton Fellowship Program.
eXpress Math -- v2.0 graphical user interface revision
- Tim McFadden, '97 and John Crowley, '99 -- Summer 1996 Gebbie Student Researchers.
eXpress Math v1.0
- Marie Chapman, '96 – Spring 1996 Wheaton Foundation Grant.
Distributed copies of eXpress Math software and documentation
- Tung Nguyen, '96 - January 1996 Wheaton Fellowship Program.
Object-oriented classes for event-driven programming
- Tung Nguyen, '96 - January 1995 Wheaton Fellowship Program.
Inside Macintosh

Independent Studies

<i>Bioinformatics Research (Spring 2018)</i>	Arianna Alfiero '19, Nate Awkerman '18, Caren McCarthy '18, Kathleen Orechia '18, Elspeth Stewart '18, Alex Zhang '19
<i>Lexos Development (Fall 2017)</i>	Cheng Zhang '18, Emma Steffens '18, Alvaro de Landaluce '17, Weiqi Feng '19
Eye Tracking (2016-2017) https://wheatoncollege.edu/news/first-sight/	Xinru Liu '19 and Dmitri Korin '20
<i>Machine Learning (Fall 2015)</i>	Khaled Sharafaddin '16 and Jingxian Liu '16
<i>Mining NextGen Sequence Data (Spring 2014)</i>	Francine Camacho '14, Mengyang Li '14
<i>Future Interactions (Fall 2013)</i>	Twenty students in groups of four
<i>iOS Programming (Fall 2012)</i>	Richard Neal '14, Tri Nguyen '14, Anthony Castellini '13, Clayton Rieck '14, Taylor Wright-Sanson '13
<i>In Pursuit of Small RNAs (Fall 2012)</i>	Chris DeMolles '13, Mengyang Li '14
<i>Genomics Research (Horizontal Transfer) (Fall 2011)</i>	Kelsey Hichens '14, Emily Baldwin '14
<i>Experiments in Text Mining (Spring 2011)</i>	Christina Nelson '11
<i>Mobile App Development (Fall 2011)</i> <i>(medPing v2.0)</i>	Ethan Levian '14, Nick Faulconer '12, Tyler Santos '12, Tim Gwynne '12, Raul Gil '12
<i>Topics in Bioinformatics (Fall 2009)</i>	Madeline Odigie '10
<i>Microbial Genomes (Fall 2009)</i>	Neil Kathok '10
<i>Programming Mobile Devices (Fall 2005)</i>	Nguni Phakela '06, Evan Fink '06, Sarah Milewski '07, Alex Cook '08
<i>Experiments in Putative Regulatory Sites (Spring 2004)</i>	Steve Benz '05
<i>Educational software for word problems (Fall 2002)</i>	Rauny Baez '03
<i>Systems Engineering in Genomics (Fall 2000)</i>	Nathan Buggia '01
<i>Artificial Intelligence (Spring 1999)</i>	Chris Zahka '99, Ruben Kim '99, Glen Aspeslagh '00
<i>Java and Security (Spring 1999)</i>	Aaron Willis '99, Travis Riley '99, David Sartory '00
<i>Neural Networks (Spring 1998)</i>	Ken Aspeslagh '00
<i>Genomics (Spring 1998)</i>	Glen Aspeslagh '00
<i>Advanced Object-Oriented Programming (Fall 1998)</i>	Ken Aspeslagh '00
<i>Java and Security (Fall 1997)</i>	Kim McClure '98, Todd Oldenburg '98, Ruben Kim, '99, Nathan Buggia, '01

Independent Studies continued

Network Administration (Fall 1998)

Matt Pasquale '99

eXpress Math (Spring 1996)

Tung Nguyen, '96, David McClintock, '95,
Andrew Ullmann '95, Marie Chapman, '96

Apple Scripting (Fall 1996)

Tung Nguyen, '96