Curriculum Vitae

David White

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EMPLOYMENT

- Associate Professor, Department of Mathematics & Computer Science, Denison University, 2020-present.
- Assistant Professor, Department of Mathematics & Computer Science, Denison University, 2014-2019.

EDUCATION

- Ph.D., Mathematics, Wesleyan University, 2014.
  Thesis: *Monoidal Bousfield Localization and Algebras over Operads.*
- M.A., Computer Science, Wesleyan University, 2012.
  Thesis: *Traversal of Infinite Graphs with Random Local Orientations.*
- B.A., Mathematics, Bowdoin College, 2008. Minor in Computer Science.
- Budapest Semesters in Mathematics, Fall 2007.

RESEARCH INTERESTS

- Localization, Stable Homotopy Theory, Monoidal Model Categories, Equivariant/Motivic Homotopy Theory, Homological Algebra, Representation Theory, Higher Category Theory, Goodwillie Calculus.
- Discrete Mathematics, Randomized Algorithms, Social Network Graphs, Game Theory, Applied Statistics, Time Series Models, Epidemiology, Data Science Education, Topological Data Analysis, Data Science for Social Good.

PUBLICATIONS

1. An analysis of protesting activity and trauma through mathematical and statistical models, with Nancy Rodriguez. *Crime Science*, volume 12, Article number: 17, 2023.
2. Left Bousfield Localization without Left Properness, with Michael Batanin, *The Journal of Pure and Applied Algebra*, Volume 228, Issue 6, June 2024.
3. A Variant of a Dwyer-Kan Theorem for Model Categories, with Boris Chorny. Accepted to *Algebraic and Geometric Topology*, 2023.
4. Right Bousfield Localization and Eilenberg-Moore Categories, with Donald Yau. *Higher Structures* 7(1):22-39, 2023.
5. Smith Ideals of Operadic Algebras in Monoidal Model Categories, with Donald Yau. Accepted to *Algebraic and Geometric Topology*, 2023.
6. Homotopy Theory of Algebras of Substitudes and their Localisation, with Michael Batanin, *Transactions of the American Mathematical Society*, Volume 375, Number 5, May 2022, Pages 3569-3640.

7. Monoidal Bousfield Localization and Algebras over Operads, in *Equivariant Topology and Derived Algebra*, volume 474 of *London Math. Soc. Lecture Note Series*, Cambridge University Press, pp. 180-240, 2022.

8. VEGF-A, PDGF-BB and HB-EGF engineered for promiscuous super affinity to the extracellular matrix improve wound healing in a model of type 1 diabetes, joint with Jeffrey Hubbell, Michael White, and Priscilla Briquez, *Nature: Regenerative Medicine*, 6, Article number: 76, 2021.

9. Substitudes, Bousfield Localization, Higher Braided Operads, and Baez-Dolan Stabilization, *Mathematisches Forschungsinstitut Oberwolfach*, Number 46, 2021: Homotopical Algebra and Higher Structures, pp. 56-60, DOI 10.14760/OWR-2021-46.

10. A Statistical Analysis of Drug Seizures and Opioid Overdose Deaths in Ohio from 2014 to 2018, joint with Lin Ma ('20) and Lam Tran ('21), *Journal of Student Research*, vol. 10(1), 2021.

11. Left Bousfield Localization and Eilenberg-Moore Categories, with Michael Batanin. *Homology, Homotopy, and Applications*, vol. 23(2), pp.299-323, 2021.

12. Right Bousfield Localization and Operadic Algebras, with Donald Yau. *Tbilisi Mathematics Journal*, Special Issue (HomotopyTheorySpectra), pp. 71-118, 2020.

13. *Introduction to Data Systems: Building from Python*, joint with Thomas Bressoud. Springer Nature, 1st Edition, 828 pages, 2020. ISBN 978-3-030-54370-9. DOI 10.1007/978-3-030-54371-6.

14. Chapter on Basic Statistics for the edited volume *Data Science For Mathematicians*. Edited by Nathan Carter. Chapman and Hall/CRC, 1st edition, 544 pages, 2020. ISBN-13: 978-0367027056.

15. The User's Guide Project: Looking Back and Looking Forward, with Don Larson, Kristen Mazur, and Carolyn Yarnall. *Journal of Humanistic Mathematics*, Volume 10, Issue 1, pages 411 - 430, 2020.

16. An Alternative Approach to Equivariant Stable Homotopy Theory, with Mark Hovey. *Tbilisi Mathematics Journal*, Special Issue on Homotopy Theory, Spectra, and Structured Ring Spectra, 51-69, 2020.

17. Homotopical Adjoint Lifting Theorem, with Donald Yau. *Applied Categorical Structures*, Volume 27 (2019), Issue 4, pages 385-426.

18. Arrow Categories of Monoidal Model Categories, with Donald Yau. *Mathematica Scandinavica*, 125(2), 185-198 (2019).

19. A Project Based Approach to Statistics and Data Science, *PRIMUS*, Volume 29, Issue 9 (2019), pages 997-1038. doi: 10.1080/10511970.2018.1488781.

20. An Overview of Schema Theory, *The Graduate Journal of Mathematics*, Volume 3, Issue 2 (2018), pages 37-59.

21. Encoding Equivariant Commutativity via Operads, with Javier Gutiérrez. *Algebraic and Geometric Topology*, Volume 18, Number 5 (2018), pages 2919-2962.

22. Bousfield Localization and Algebras over Colored Operads, with Donald Yau, *Applied Categorical Structures* Volume 26, Issue 1 (2018), pages 153-203.

23. Model Structures on Commutative Monoids in General Model Categories, *Journal of Pure and Applied Algebra* Volume 221, Issue 12 (2017), pages 3124-3168.

24. Curriculum Guidelines for Undergraduate Programs in Data Science, with Richard De Veaux, et al, *Annual Review of Statistics and Its Application*, Volume 4 (2017), pages 15-30.

25. Baez-Dolan Stabilization via (Semi-)Model Categories of Operads, with Michael Batanin, in "Interactions between Representation Theory, Algebraic Topology, and Commutative Algebra," *Research Perspectives CRM Barcelona*, Volume 5 (2015), pages 175-179, ed. Dolors Herbera, Wolfgang Pitsch, and Santiago Zarzuela. Birkhäuser, DOI 10.1007/978-3-319-45441-2.

26. A Rational Choice Model of the Rise of Self-Proclaimed States Encompassed in Weak Post-Soviet Economies, with Olga Nicoara. Peer reviewed working paper presented at the 2015 Association of Private Enterprise Education International Conference. Available as arXiv:1606.02748.

27. The User's Guide Project: Giving Experiential Context to Research Papers, with Cary Malkiewich, Mona Merling, Frank Lucas Wolcott, and Carolyn Yarnall. *Journal of Humanistic Mathematics*, 5 (2015), no. 2, 186-188.

28. A User's Guide: Monoidal Bousfield localizations and algebras over operads, *Enchiridion: Mathematical User's Guides*, Vol. 1 (2015).

29. Monoidal Bousfield Localization and Algebras over Operads, Wesleyan Library, 2014.

30. Traversals of Infinite Graphs with Random Local Orientations, Wesleyan Library, 2012. Available through WesScholar, Lambert publishing, or as arXiv:1308.1041.

31. White Paper Research Report (title is classified), *Internal NSA Journal, Division R6*, 2010.

32. An Investigation into the Structure of Digroups, with A. Magyar, K. Prifogle, and W. Young, *Proceedings of the Wabash Summer Institute in Algebra*, 2007.

RESEARCH SUPERVISED

1. Testing the Turtle Stock Trading Algorithm, with Phong Hoang ('24).

2. Data Driven Journalism and the Opioid Epidemic (2019), with Lin Ma ('20) and Lam Tran ('21), ongoing.

3. Data Streaming Methods for Linear Regression Inference Testing, by Colin Smith ('20), submitted.

4. An Overview of Spatial Econometrics, Alex Tybl ('16), arxiv:1605.03486 and Social Science Research Network (SSRN) number 2778679.

5. Using Genomics to Predict Learning Disabilities, Trevor Masters ('16)

6. Parallel Search on Intersection Graphs, with Jessica Tang ('16)

PREPRINTS

1. Quasi-tame substitudes and the Grothendieck construction, with Michael Batanin and Florian de Leger, available as arXiv:2311.07322, submitted.

2. Model structures on operads and algebras from a global perspective, with Michael Batanin and Florian de Leger, available as arXiv:2311.07320, submitted.

3. Comonadic Coalgebras and Bousfield Localization, with Donald Yau. Available as arXiv:arXiv:1805.11536. Submitted.

4. On Colimits in Various Categories of Manifolds, available from the author's webpage. Submitted.

5. A short note on smallness and topological monoids, soon to be submitted.

6. The statistical and dynamic modeling of protests in Ukraine: the Revolution of Dignity and preceding times, with N. Rodriguez, Y. Bahid, and O. Kutsenko. Submitted.

TEACHING EXPERIENCE

- Denison University:
  - Applied Statistics (Math 242).
  - Statistical Modeling (Math 401/420).
  - Probability Modeling for Actuaries (Math 361).
  - Data Mining and Time Series Analysis (Math 364).
  - Bayesian Statistics and Survival Analysis (Math 363).
  - Probability, Computing, and Graph Theory (Math 427/CS 335).
  - Time Series Analysis (Math 422).
  - Calculus I (Math 135).
  - Calculus II (Math 124/145).
  - Linear Algebra (Math 213).
  - Set Theory and Category Theory, Math 364, directed study.
  - Galois Theory (Math 364), directed study.
  - Measure Theory (Math 363).
  - Topology (Math 445).
  - Scientific Data and Dynamics (CS 111).
  - Markets, Polls, and Social Networks (CS 112).
  - Foundations of Computer Science Through Applications to the Social Sciences (CS 109).
  - Data Systems (CS 181).
  - Mathematical Foundations of Computer Science (CS 234).
  - Big Data (CS 362).
  - Natural Language Processing, CS 363, directed study.
  - Social Network Graphs, CS 364, directed study.
  - Randomized Algorithms (Math/CS 401).
- Graduate Student Instructor, Wesleyan University:
  - Precalculus (Math 107), Wesleyan University Center for Prison Education.
  - Introduction to Statistics (Math 132).
  - Graduate Pedagogy (Math 501).
  - Integral Calculus (Math 118).
- Graduate Teaching Assistant, Wesleyan University.
  - Introduction to Programming (using Java, Visual Basic, and Python), Computer Science II (using Python).
  - Differential Equations, Integral Calculus (Advanced Version), Point-Set Topology, Elementary Statistics, Introduction to Probability & Statistics.

GRANTS / EXTERNAL FUNDING

- RC Good Fellowship, "Convenient Combinatorial Categories of Topological Spaces," Principal Investigator, 2022-2023. Funding for a research leave.
- COVID Re-engagement Grant, "The McClure-Smith Conjecture," Principal Investigator, 2021-2022. Funding to conduct research with Michael Batanin in Prague, Czech Republic.
- Pedagogical Practice Projects Grant, "Inviting Data Analytics Majors into Introductory Computer Science," Principal Investigator, internal Denison grant, fall 2019.
- Center for Teaching and Learning, funding for Pedagogy and Resilience reading group, Denison University, 2019-2020.
- Collaborating researcher on Spanish Ministry MTM2016-76453-C2-2-P, 'Topología algebraica y de baja dimensión,' PIs Carles Casacuberta and Javier Gutiérrez, 2017-2020.
- Collaborating researcher on ISF Grant 1138/16, Israeli Science Foundation, PI Boris Chorny, 2016-2020.
- Collaborating researcher on Australian Research Council grant DP160101519, 2016-2018. PIs Ross Street, Steve Lack, Richard Garner, and Dominic Verity.
- Pedagogical Practice Projects grant, "A Project-Based Approach to Mathematical Modeling in Calculus," Principal Investigator, internal Denison grant, Spring 2017.
- Pedagogical Practice Projects grant, "A Project-Based Approach to Statistics Across Disciplines," co-Principal Investigator with Andrew McCall, internal Denison grant, Spring 2016.
- Project NExT Fellow, 2015-2016.
- Center for Mathematics and Scientific Computation, "Equivariant cellularization and nullification," co-Principal Investigator with Boris Chorny, 2015.
- Denison University Research Table Grant, "Ethics in Cyber Space," co-Principal Investigator with Joan Krone and John McHugh. Funding for interdisciplinary research, undergraduate research, developing pedagogy, and to bring several external speakers to campus in 2015-2016.
- National Science Foundation, East Asia and Pacific Summer Institutes for U.S. Graduate Students (EAPSI): "Studying the Interplay between Localization and Categorical Algebra via Algebraic Topology," Principal Investigator. Funded to be a visiting scholar at Macquarie University working with Michael Batanin. Additional funding provided by Australian Academy of Sciences. Award Number IIA-1414942.
- AMS Graduate Student Travel Grant for travel to Joint Mathematics Meetings, January 2014.
- National Science Foundation Travel Grant for Type Theory, Homotopy Theory, and Univalent Foundations conference held in Barcelona, Spain, September, 2013.
- AMS Funding to start Graduate Student Chapter at Wesleyan, 2013.

RESEARCH EMPLOYMENT AND RESEARCH VISITS

- Research Visits
  - Masaryk University, 2022, funded by Czech Science Foundation grant GA22-02964S and Denison COVID Re-engagement Grant.

- Institute of Mathematics of the Czech Academy of Sciences, 2022, funded by Czech Science Foundation grant GA18-07776S and Denison COVID Re-engagement Grant.
- US Junior Oberwolfach Fellow, September, 2021.
- Macquarie University, March - May, 2018, keynote speaker for the "Focus Month on Quillen Model Categories." Funded by Australian Academy of Sciences.
- Universidad Austral de Chile, December 2017 - January 2018.
- University of Kagoshima, September 2017.
- Institut de Mathemàtica, Universitat de Barcelona, May-July 2017. Funded by Spanish Ministry.
- Macquarie University, December 2016 - January 2017. Supported by the Australian Academy of Science.
- Max Planck Institute, March 2016. Funded by NSF.
- Oranim University, Haifa, Israel, July 2015.
- Hausdorff Institute of Mathematics, Bonn, Germany, June 2015. Funded by NSF.
- Ohio State Newark, May 2014.
- Universitat Autònoma de Barcelona, September 2013. Funded by NSF.
- Institut de Mathemàtica, Universitat de Barcelona, May-June 2013. Funded by IMUB.

- NSF East Asia and Pacific Summer Institutes for U.S. Graduate Students (EAPSI) Visiting Scholar, Macquarie University, Sydney, Australia June-August 2014.
- National Security Agency, Graduate Mathematics Program, May-August 2010
  - Worked with another graduate student to do exploratory data analysis on an NSA data set using the cloud computing environment MapReduce as well as IBM InfoSphere Streams, an architecture for stream computing.
  - Represented the data set as a graph. Applied and developed numerous graph algorithms for component-finding, barycentric clustering, social network analysis, and finding substructures.
  - Passed an Agency Special Background Investigation and a polygraph test, held a TS//SCI security clearance. Attended Classified NSA Mathfest conference.
  - Briefed Director of NSA. Received ceremonial coin for outstanding work. Presented findings to Institute for Defense Analyses at the Centers for Communications Research (CCR-P) and for Computing Sciences (CCS).
  - Published a research paper in an internal NSA journal.

SELECTED PROFESSIONAL PRESENTATIONS

- Conference/Workshop Presentations:
  - Higher Structures conference in Prague, invited talk, 2024.
  - *The homotopy theory of higher operads*, International Congress of Mathematicians (ICM) Topology and Geometry Sectional, Copenhagen, July 2022.
  - *Substitudes, Bousfield localization, higher braided operads, and Baez-Dolan stabilization*, Oberwolfach Workshop on Homotopical Algebra and Higher Structures, Germany, September 2021.
  - *Monoidal Model Categories and Cubical Homotopy Theory*, The International Conference on Homotopy Type Theory 2019, Carnegie Mellon University, Pittsburgh, August 2019.

- *Studying Mass Shootings with Topological Techniques*, workshop on Applied Mathematical Modeling with Topological Techniques, ICERM, Brown University, Providence, August 2019.
- *Homotopical Adjoint Lifting Theorem*, international conference on Operads and Higher Structures in Algebraic Topology and Category Theory, University of Ottawa, Canada, July 2019. Invited speaker.
- *On the existence of N_∞-operads*, Lehigh Geometry and Topology Conference, July 2019.
- *Model Categories and Functor Calculus*, Functor Calculus Workshop, The Ohio State University, March 2019. Invited speaker.
- *What good is a semi-model structure on algebras over an operad?*, Higher Structures, Max Planck Institute, Bonn, Germany, March 2016. Invited speaker.
- *An Application-First Approach to Statistics*, Joint Mathematics Meeting, Seattle, WA, January 2016.
- *Encoding Equivariant Commutativity via Operads*, Joint Mathematics Meeting, Seattle, January 2016.
- *A Project Based Approach to Statistics*, Ohio NExT Workshop, Capital University, OH, October 2015.
- *Six Degrees of Kevin Bacon, Intersection Graphs, and Algorithms*, Ohio MAA Section, October 2015.
- *The Baez-Dolan Stabilization Hypothesis*, Young Topologists Meeting, Lausanne, Switzerland, July 2015.
- *Localizations of Commutative Equivariant Ring Spectra*, Moroccan Area of Algebraic Topology (MAAT) Conference, Rabat, Morocco, June 2015. Invited speaker.
- *Model Categories of Commutative Monoids and L_∞-algebras*, Graduate Student Summer School in Mehdia, Morocco, June 2015. Invited speaker.
- *An introduction to model categories*, Graduate Student Summer School in Mehdia, Morocco, June 2015. Invited speaker.
- *Baez-Dolan Stabilization via (Semi-)Model Categories of Operads*, Conference: Opening Perspectives in Algebra, Representations, and Topology (OP-ART), Barcelona, May 2015.
- *Baez-Dolan Stabilization and the Importance of Left Properness*, 2015 Lehigh University Geometry and Topology Conference in honor of Don Davis, May 2015.
- *The Motivic Steenrod Algebra*, Talbot Conference, March 2014.
- *Bousfield Localization and Commutative Monoids*, Homotopy Theory Special Session, Mathematics Joint Meetings, Baltimore, January 2014.
- *Traversals of Infinite Graphs with Random Local Orientations*, Mathematics Joint Meetings, Baltimore, January 2014.
- *Motivic localization, cellularization, and Brown-Comenetz duality*, Union College Mathematics Conference: Algebraic Topology Session, October 2013.
- *Stable Model Categories are Categories of Modules*, WCATSS13, Eugene, Oregon, September 2013.
- *An Investigation into the Structure of Digroups*, the Brown Symposium for Undergraduates in the Mathematical Sciences, Brown University, March 2008.

- Seminar Presentations
  - Bowling Green University colloquium, 2024.
  - The Ohio State University, Homotopy Theory Seminar, 2023.
  - Mathematical Institute CAS, Prague, July 2022.
  - Charles University, Czech Republic, June 2022.
  - Masaryk University, Brno, Czech Republic, June 2022.

– Institute of Mathematics of the Czech Academy of Sciences, June 2022.
– The American University in Sharjah, colloquium, March 2022.
– NYU Abu Dhabi, March 2022.
– The University of Western Ontario, February 2022.
– Harvey Mudd College, February 2020.
– The Ohio State University, Homotopy Theory Seminar, January 2020.
– Denison Science Association, January 2020.
– Kent State University, Colloquium, December 2019.
– Erie Categories and Topology Seminar, Kent State University, November 2019.
– Johns Hopkins Topology Seminar, April 2019.
– The Ohio State University, Homotopy Theory Seminar, January 2019.
– Australian Category Seminar, Macquarie University, April 2018.
– Instituto Argentino de Matemática, Buenos Aires, March 2018.
– Seminario de Topologia of the Universidad de Buenos Aires, March 2018.
– Seminar Of Algebra del Instituto de Matemática y Estadística in Montevideo, February 2018.
– Topology Seminar, Universidad Autonoma de Barcelona, June 2017.
– Topology Seminar, University of Barcelona, June 2017.
– Infinity Category Seminar, the Ohio State University, March 2017.
– Topology and Geometry Seminar, Penn State Altoona, March 2017.
– Australian Category Seminar, Macquarie University, Sydney, January 2017.
– Topology Seminar, Wayne State University, October, 2016.
– Denison Science Association, September 2015.
– Topology and Geometry Seminar, University of Haifa, Israel, July 2015.
– Algebraic Topology Seminar, Radboud Topology Group, Nijmegen, The Netherlands, June 2015.
– Topology/Geometry Seminar, Penn State Altoona, May 2015.
– The Copenhagen Topology Seminar, University of Copenhagen, April 2015.
– Topology Seminar, University of Illinois at Urbana-Champagne, April 2015.
– Topology Seminar, Ohio State University, March 2015.
– Algebraic Topology Seminar, University of Illinois at Chicago, March 2015.
– Australian Category Seminar, Macquarie University, Sydney, July 2014.
– Algebra, Geometry, and Topology Seminar, University of Melbourne, July 2014.
– Wesleyan Topology Seminar, Ph.D. defense, May 2014.
– Topology Seminar, University of Kentucky, March 2014.
– Johns Hopkins University, February 2014.
– Job Talk, Denison University, January 2014.
– Topology Seminar, University of Chicago, January 2014.
– Topology Seminar, University of Virginia, November 2013.

– Faculty Seminar, Bowdoin College, October 2013.
MIT Juvitop Seminar, Boston, MA, March 2013.
– UIUC Topology Seminar, Urbana, IL, February 2013
– Mathematics Colloquium, Central Connecticut State University, April 2012
– Graduate Student Seminar, Yale University, Nov. 2011.

SERVICE

- Denison ombuds group, 2024-present.
- Denison Forward task force on recruitment and retention of diverse faculty, 2022-present.
- Actuarial Studies Coordinator, Department of Mathematics, 2021-present.
- Developed a Denison Seminar called *Oceanographic Data Analysis*, 2021.
- Co-organizer of *The Resilience Circle*, Denison Center for Learning and Teaching, 2020-2021.
- Co-organizer of *Pedagogy & Resilience Reading Group*, Denison Center for Learning and Teaching, 2019-2020.
- Member of Working Group on S/Grade Policy, Spring 2020.
- Member of the Academic Standing Board, 2019 - 2020.
- Faculty Advisor, Actuarial Science Club, 2019 - 2020.
- NSF Grant Panelist, Directorate for Education and Human Resources, 2019.
- Editor, Graduate Journal of Mathematics, 2018 - present.
- Co-organizer of Columbus Junior Faculty Meetup, 2018-2022.
- Referee for Springer, Cambridge University Press, PLOS One, Transactions of the American Mathematical Society, Memoirs of the American Mathematical Society, Expositiones Mathematicae, Advances in Mathematics, Geometry and Topology, Algebraic & Geometric Topology, the Journal of Pure and Applied Algebra, Tunisian Journal of Mathematics, Theory and Applications of Categories, Applied Categorical Structures, Journal of Algebra, Higher Structures, the New York Journal of Mathematics, Annali di Matematica Pura ed Applicata, The Journal of Algebra and its Applications, Homotopy, Homology, and Applications, the Journal of Homotopy and Related Structures, Publicationes Mathematicae, the Quarterly Journal of Mathematics, Abhandlungen aus dem Mathematischen Seminar der Universität Hamburg, Communications in Algebra, the College Mathematics Journal, the Graduate Journal of Mathematics, the User's Guides Project, Davidson Fellows Program (Davidson Institute for Talent Development), Symmetry, Big Data and Cognitive Computing .
- External PhD committee member: University of Melbourne, Case Western University.
- Reviewer for AMS Mathematical Reviews, 2017-present.
- Reviewer for zbMATH (formerly Zentralblatt Math), 2018-present.
- Co-organizer of faculty reading group *Teaching Statistical Concepts*, Denison Center for Learning and Teaching, 2016-2017.
- Member of Pro Math Arte (PMA) Council, which advises the Board of the Budapest Semesters in Mathematics Program, 2015-present.

- Editor and co-founder, *The User's Guide Project*, https://mathusersguides.com/, 2015-2018.
- Faculty Adviser, Denison TEDx, 2015-2017.
- Internship and REU Coordinator for my department, 2014-2017.
- Study Abroad Coordinator for my department, 2014-present.
- Curator for https://mathmeetings.net/, a list of conferences, 2013-present.
- Founder and President of AMS Student Chapter at Wesleyan University. 2012-2014.
- Organized Wesleyan University Topology Seminar, 2012.
- Organized Wesleyan University Graduate Student Seminar, 2011-2012.
- Graduate Representative on Wesleyan Reaccreditation Committee, 2011-2014.
- Graduate Representative on Wesleyan Educational Policy Committee, Sept. 2009-May 2010.
- Member of Executive Board for Graduate Student Association, Sept. 2009-May 2011.