

Aihua Li, Ph.D.

February 2013

PERSONAL INFORMATION

Department of Mathematical Science
Montclair State University
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EDUCATION

| | | |
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| <u>Ph.D. Mathematics</u> | University of Nebraska-Lincoln | 1994 |
| <u>M.S. Mathematics</u> | University of Nebraska-Lincoln | 1991 |
| <u>M.S. Mathematics</u> | University of Science and Technology | 1984 |
| <u>B.S. Mathematics</u> | Beijing, China | 1982 |

Ph.D. Advisor: Sylvia Wiegand,

Ph. D. Thesis: Posets of Prime Ideals and Prime Filtrations of Finite Generated Modules

PROFESSIONAL EXPERIENCE

Montclair State University, Department of Mathematical Science

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| <u>Professor</u> | September 2011 – present |
| <u>Doctoral Faculty, Ed. D. Math Education</u> | September 2011 – present |
| <u>Associate Professor</u> | September 2004 – August 2011 |

Loyola University New Orleans, Department of Mathematics & Computer Science

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| <u>Associate Professor</u> | August 2000 – July 2004 |
| <u>Assistant Professor</u> | August 1995 – August 2000 |

Virginia Bioinformatics Institute at Virginia Tech, Virginia Tech - Department of Math.

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| <u>Visiting Research Associate Professor</u> | September 2002 – May 2003 |
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Bismarck State College, Department of Mathematics

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| <u>Assistant Professor</u> | August 1994 – July 1995 |
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University of Science & Technology Beijing

Department of Mathematics & Mechanics

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| <u>Joint Professor</u> | 2003 – present |
| <u>Instructor</u> | Dec. 1984 – Jan. 1989 |

HONORS AND AWARDS

Sokol Research Award for Faculty and Student Research, CSAM, MAU, 2009/2010, 2007/2008;

General Membership, Mathematical Sciences Research Institute (MSRI), May 2003.

Certificate of Honor for Support and Encouragement to Graduating Students, Loyola Senior Class & Student Government Association, 2001.

Teaching Recognition Award, February 1992, Parent Association/Teaching Council, University of Nebraska-Lincoln.

Awards of Mentored Students

- Katrina Bandeli, Sum Indices and Product Indices of Single Cyclohexane Chemical Compounds, First Prize, GSUMC Garden State Undergraduate Mathematics Conference) Undergraduate Poster Competition, March 2012.
- Kale Evens, “Study of GCDs of Solutions to Diophantine Equations”, Second Place Award in the undergraduate poster competition of Garden State Undergraduate Mathematics Conference held in New Jersey, April, 2010.

- Elizabeth Arango, “Behavior of DS-divisors of Positive Integers”, won “Outstanding Presentation Award” in the MAA MathFest Undergraduate Student Talk Sessions, Madison, Wisconsin, August, 2008;
- Cihan Karabulut, “Solving Diophantine Equations Using a Partial Differential Equation” winning a prize in the Undergraduate Student Poster Competition held in the AMS/MAA National Meeting in San Diego, 2008;
- Nicole Robichaux, “DS-Divisor of Positive Integers”, First Place and a monetary prize, MAA LA-MS Section Annual Meeting student paper competition, 2003;
- Nicole Robichaux, “DS-Divisor of Positive Integers” winning the Rev. John H. Mullahy Award, by Sigma Xi, the Scientific Research Society, New Orleans Chapter, 2003.

GRANTS AWARDED (since 2000)

1. “Garden State Mathematics Conferences 2013-2014”, \$16,592.00, NSA, awarded 2012.
2. “The 2013 Garden State Undergraduate Mathematics Conference (GSUMC)”, MAA “Regional Undergraduate Mathematics Conferences Program” funded by NSF DMS-0846477, DMS-0846477 (CFDA No. 47.049), \$2000, Awarded May 2012
3. MAA/NSF Regional Undergraduate Mathematics Conference Grant for GSUMC 2011 (Co-PI), NSF Grant DMS-0846477, \$1200, 2010.
4. NSF CURM (Center for Undergraduate Research in Mathematics) mini-grant, \$16,500, 2009/2010;
5. MSU Separately Budgeted Research Funding, FY 2009/2010;
6. Award for Undergraduate Research, Investors Savings Bank Charitable Foundation/CSAM, \$3500, 2008/2009;
7. NREUP (National Research Experience for Undergraduates Program) “Summer REU at MSU”, NSF, NSA, Moody Foundation, Summer 2008;
8. NSF CURM (Center for Undergraduate Research in Mathematics) mini-grant, 2007/2008;
9. NSF Conference Grant: Nebraska Commutative Algebra Conference 2005, (Co-PI), May 2005.
10. Collaborative Research Grant for Women, Association for Women in Mathematics (AWM), Supported by the University of North Texas and NSF through Ruth Michler’s POWRE grant, 2004.
11. Board of Regent Supporting Fund, “Applications of Gröbner Basis Theory,” Louisiana State, 2000--2003.

REFEREED PUBLISHED ARTICLES

1. Aihua Li and Ralph Tucci, “Zero Divisor Graphs of Upper Triangular Matrix Rings”, *Communications in Algebra*, Vol. 41, (12), 2013.
2. Sarita Nemani, Aihua Li, “Interlace Polynomials of n-claw Graphs”, *Journal of Combinatorial Mathematics and Computational Computing*, to appear.
3. Michael K. Wilson, Aihua Li, “Solving Second Order Discrete Sturm-Liouville BVP Using Matrix Pencils, to appear in the book chapter: *Advances in Applied Mathematics and Approximation Theory: Contributions from AMAT 2012*, Chapter 12.
4. Xiao-dan Zhang, Ya-li Hong, and Aihua Li, “Optimization of axial symmetrical FGM under the transient-state temperate field”, *International Journal of Minerals, Metallurgy and Materials*, Vol. 19, No. 1, Pages 59-63, Jan 2012.
5. Elizabeth Arango, Aihua Li, “The Behavior of DS-divisors of Positive Integers”, *International Journal of Pure and Applied Mathematics*, Vol. 70, No. 6, 2011.
6. Aihua Li, Edward Mosteig, “On the Construction of Explicit Solutions to the Matrix Equation $X^2AX = AXA$ ”, *Electronic Journal of Linear Algebra*, Vol. 21, pp. 159-170, 2010.
7. Aihua Li, Qing Wu, “Interlace Polynomial of Ladder Graphs”, *Journal of Combinatorics, Information, and System Science*, vol. 35 No. 1-2, pages 261–273, 2010.
8. Zhang Xiaodan, Wang Fei, Deng Qin, Aihua Li, “Construction and Applications of Multivariate Separators” (in Chinese), *Acata Mathematica Applicatae Sinica*, Vol. 33 No. 2, March 2010.

9. Zhang Xiaodan, Zhao Pin-Dong, Aihua Li, "Construction of a New Fractional Chaotic System and Generalized Synchronization", *Commun. Theor. Phys.* Vol. 53, No. 6, 1105 – 1110, 2010.
10. Aihua Li, Michael Wilson, "Tracing Certain n-Dimensional Space Points", *Pi Mu Epsilon Journal*, Vol. 12, No. 10, 2009.
11. Aihua Li, Mika Munakata, "Building Mathematically", *Mathematics Teacher*, Vol. 103, Issue 1, Page 14, 2009.
12. Joseph P. Brennan, Aihua Li, Qun Huo, "Advancing Lattice Path Models for Nanoparticle Percolation of Conductivity in a Non-conductive Matrix", *Journal of Computational and Theoretical Nanoscience*, Vol. 6, No. 3, 519–524, March 2009.
13. Aihua Li, "American Classroom Teaching and Inspiration – Observation of one Sample Class Taught by U. S. Teachers", *Mathematics Curriculum - Practice and Research*, Beijing Normal University Publisher, 383 – 399, 2009.
14. Xiaoying Teng, Aihua Li, "Bilingual Content-based Teaching – An Important Component for Education Globalization", Proceedings of "the 12th World Multiconference on Systemics, Cybernetics and Informatics: WMSCI 2008", Paper A960DH, Orlando, Florida, 29 – July 3, 2008.
15. John Wang, Dajin Wang, and Aihua Li, "Goal Programming and Its Variants", in Adam, F. (ed.) *Encyclopedia of Decision Making and Decision Support Technologies*, Vol. 1, A– lm, 410 – 417, Information Science Reference, Hershey, PA, 2008.
16. Xiangjun Min, Aihua Li, "Algebraic Methods in Multivariate Polynomial Interpolation", *Proceedings of the Sixth EUROSIM Congress on Modeling and Simulation*, Ljubljana, Slovenia, September 2007.
17. Betty Jean Harmsen, Aihua Li, "Discrete Sturm-Liouville Problems with Nonlinear Parameter in the Boundary Conditions", *Journal of Difference Equations and Applications*, Vol. 13, Issue 7, 639 - 653, 2007.
18. Min, Xiangjun, Zhang, Xiaodan, and Aihua Li, "Algebraic Models of Discrete Time Series", Shandong Ligong Xue Bao, *Journal of Shandon University of Technology (Natural Science Edition)*, Vol. 21, no. 5, pages 93 – 96, 2007.
19. Xiaona Pan, Fucheng Liao, Aihua Li, "Certain Linear and Radical Models of Discrete Time Series", *International Journal of Pure and Applied Mathematics*, Vol. 28, no. 4, pages 487-501, 2006.
20. Aihua Li, Irena Swanson, "Symbolic Powers of Radical Ideals", *Rocky Mountain Journal of Mathematics*, vol. 36, no. 3, 2006.
21. Guiting Li, Bingtuan Wang, and Aihua Li, "Genetic Operators Design Using Division Algorithm in the Solution Space", *Proceedings of the IASTED International Conference on Modeling and Simulation*", pages 286-290, Montreal, May, 2006.
22. Aihua Li, Serpil Saydam, "Linearity of Polynomial Models of Discrete Time Series", *Proceedings of the IASTED Fifth International Conference on Modeling, Simulation, and Optimization*", pages 125-128, Aruba, August, 2005.
23. Aihua Li, "An Algebraic Approach to Building Interpolating Polynomials", *Discrete and Continuous Dynamical System*, Suppl. Vol., pages 597-604, 2005.
24. Aihua Li, "Polynomial Models of Discrete Time Series", *Proceedings of Dynamic Systems and Applications*, vol. 4, pages 68-73, 2004.
25. Aihua Li, Chuang Peng, "Linear Transformations on Polynomial Models of Time Series", *International Journal of Pure and Applied Mathematics*, Vol. 17, no. 2, pages 235-248, 2004.
26. Aihua Li, Sindhu Unnithan, "A Sequence Constructed from Fibonacci Numbers", *Applications of Fibonacci Numbers*, Vol. 9, 159-166, ed. by Fredric T. Howard, Kluwer Academic Publisher (*Proceedings of the Tenth International Conference of Fibonacci Numbers*), 2003.
27. Betty J. Harmsen, Aihua Li, "Discrete Sturm-Liouville Problems with Parameter in the Boundary Conditions", *Journal of Difference Equations and Applications*, Vo. 8, no.11, pp. 969-981, 2002.
28. Aihua Li, Duane Randal, "Non-trivial Solutions to Certain Matrix Equations", *Electronic Journal of Linear Algebra*, Vol. 9, pp. 282-289, 2002.

29. William J. Heinzer, Aihua Li, Louis J. Ratliff Jr., and David E. Rush, “Monoidal extensions of a Cohen-Macaulay Unique Factorization Domain”, *Transactions of the American Mathematical Society*, 354, 1783--1791, 2002.
30. Aihua Li, “Birational Extensions of a Noetherian UFD”, *Communications in Algebra*, 28(1), 209--216, 2000.
31. Aihua Li, “Prime Elements of Birational Extensions of a Noetherian UFD”, *Algebra and its Applications*, Contemporary Mathematics Series, pp. 371-376, Volume 259, 2000.
32. Aihua Li, Sylvia Wiegand, “Prime Ideals in Two-dimensional Domains over the Integers”, *Journal of Pure and Applied Algebra*, Vol. 130, Number 3, 313--324, 1998.
33. Aihua Li, Sylvia Wiegand, “The Polynomial Behavior of Prime Ideals in Polynomial Rings and the Projective Line over Z ”, *Factorization in Integral Domains*, Lecture Notes in Pure and Applied Mathematics, pp. 383-400, Volume 189, 1997.
34. Aihua Li, “Spectra of Birational Extensions of $Z[x]$ ”, *Proceedings of International Conference in Algebra and Combinatorics* (Hong Kong), pp. 321-326, Springer, 1997.
35. Aihua Li, “Partially Ordered Sets of Prime Ideals and Prime Filtrations of Finitely Generated Modules”, *Dissertation Summaries in Mathematics*, Volume I, 1-2, 1996.
36. Aihua Li, “Associated Prime Filtrations of Finitely Generated Modules over Noetherian Rings”, *Communications in Algebra*, 23(4), pages 1511-1526, 1995.
37. Aihua Li, “Compound Extensions of Groups,” *Journal of Beijing University of Science and Technology*, 1988.
38. Aihua Li, “Exploring Group Theory Using *Mathematica* and Involving Students in Research”, Proceedings of the Eleventh ICTCM (International Conference on Technology in Collegiate Mathematics), 1998.

OTHER PUBLICATIONS

1. Mika Munakata, Aihua Li, “Reflections on Montclair State University–Beijing Connection”, *MAA Focus – the New Magazine of the Mathematical Association of America*, Vol. 8, Number 8, Nov. 2008
2. Aihua Li, “Teaching Abstract Algebra with Involvement of Students' Research”, Proceedings of M/SET (International Conference on Mathematics/Science Education & Technology), 1999.

INVITED COLLOQUIUM PRESENTATIONS/PANNELIST/WORKSHOPS

1. “What Mathematics can do in Bioinformatics?” Bieber Lecture presentation at Loyola University New Orleans, sponsored by the Loyola Bieber Lecture Series, October, 2012.
2. “Randic and Sum Connectivity Indices of Certain Graphs”, invited colloquium presentation, Department of Mathematics, Beijing Jiatong University, June 2012
3. “Potential Research Topics”, invited presentation at the *Machine Learning and Information Security Workshop*, Beijing Jiaotong University, June 2012.
4. “Zero Divisor Graphs of Upper Triangular Matrix Rings”, invited colloquium presentation, University of Louisiana at Lafayette, March, 2012.
5. “On the Construction of Explicit Solutions to the Matrix Equation $AXA = XA^2X$ ”, Invited Colloquium Presentation, Department of Mathematics, Beijing Jiaotong University, July 2011.
6. “Promoting Deep Learning through Interactive Teaching”, invited key note speech in the Summer Interactive Teaching Workshop 2011, University of Science and Technology Beijing, June, 2011.
7. “On the Construction of Explicit Solutions to the Matrix Equation $AXA = XA^2X$ ”, Invited Colloquium Presentation, University of Louisiana at Lafayette, April 2011.
8. “Contributions of Ancient Chinese Mathematics”, Invited Colloquium Presentation, Department of Mathematics, Miami University, Oxford, Ohio, Dec. 2010;
9. “Chinese Abacus and its Role in Mathematics Education”, Invited Colloquium Presentation, Department of Educational Psychology, Miami University, Oxford, Ohio, Dec. 2010.

10. "Tracing Space Points – A View of Discrete Time Series Modeling", Invited Presentation at the School of Traffic and Transportation, Beijing Jiaotong University, July 2009.
11. "Ladder Graphs", Invited Presentation at Department of Mathematics, Beijing Jiaotong University, July 2009.
12. "A Current Trend of College Mathematics Education in the United States: Mathematical Modeling in Classrooms," Invited Presentation at Department of Mathematics and Mechanics, University of Science and Technology Beijing, June 2009.
13. "Polynomial Solutions to Certain Diophantine Equations", Invited Presentation at the Department of Mathematics and Mechanics, University of Science and Technology Beijing, June 2009.
14. "Undergraduate Research in the United States – Enhancing Teaching and Learning through Research", Invited Presentation at the College of Science, Beijing Jiaotong University, January 2009;
15. Invited Panelist: Mathematical Association of America (MAA) Annual National Meeting panel discussion: "*Mathematics and Mathematicians in Emerging Nations*", Jan. 2007.
16. "Development and Applications of Modern Mathematics – College Mathematics Education in the United States", Invited Presentation at School of Arts & Science, Beijing Jiaotong University, June, 2005.
17. "A Current Trend of College Mathematics Education in the United States: Mathematical Modeling in Classrooms", Invited Presentation at University of Petroleum of China, July, 2005.

RECENT CONFERENCE PRESENTATIONS

1. "Zero Divisor Graphs of Upper Triangular Matrix Rings over Commutative Rings", joint with Ralph Tucci, invited presentation at *Conference on Commutative Rings, Integer-valued Polynomials and Polynomial Functions*, Graz, Austria, Dec. 2012.
2. "Solving Second Order Discrete Sturm-Liouville BVP Using Matrix Pencils", joint with Michael Wilson, invited presentation at *the International Conference on Applied Mathematics and Approximation Theory*, held at TOBB University of Economics and Technology, Ankara, Turkey, May 2012.
3. "Randić and Sum Connectivity Indices of Certain Trees", Joint with Jennifer Feiner, presented at *Graph Theory Day 63* held at Passaic County College, April 28, 2012.
4. "Interlace Polynomials of n -Claw Graphs", Joint with Sarita Nemani* (presenter), presented at *Graph Theory Day 63* held at Passaic County College, April 28, 2012.
5. "Cryptography, a Great Topic for Undergraduate Mathematics Courses", invited presentation in the *MAA Session on Cryptology for Undergraduates*, AMS/MAA Joint National Meeting, Jan. 2011.
6. "Using Matrix Pencils to Solve Discrete Sturm-Liouville Problems with Nonlinear Boundary Conditions", invited presentation in the *Applied Linear Algebra Conference* held in Novi Sad, Serbia, 2010;
7. "Interlace Polynomials of Ladder Graphs", presented in the special session "Graphs and Combinatorics" in *the 17th International Conference on Interdisciplinary Mathematical & Statistical Techniques (IMST 17)* held in Pilsen, Czech Republic, 2009.
8. "Solving Certain Matrix Equations Using Advanced Symbolic Techniques", invited presentation in *the 3rd International Workshop on Matrix Analysis and Applications* held in Lin'an, China, 2009.
9. "Bringing Cutting-Edge Research to the Middle School Classroom" joint presentation with Mika Munakata in special session "The Ways and Methods of Curriculum and Teaching" of "*the International Conference of Tradition and Innovation on Curriculum and Instruction for 2^{1st} Centenary*", held in Beijing Normal University, December 2008.
10. "Second Order Sturm-Liouville Difference Equations with Parameters in the Boundary Conditions", invited presentation in the special session on Combinatorics and Discrete Dynamical Systems of the *Fist AMS Joint Meeting with Shanghai Mathematics Society*, Shanghai, China, December 2008.

11. “Interlace Polynomials of Certain Graphs”, Joint with Qing Wu, presented in “*Graph Theory Day 56*” Conference, Connecticut, November 2008.
12. “Tracing n-dimensional Space points”, invited presentation in the special session on *Research with Undergraduates*, MAA MathFest, Madison, Wisconsin, Aug. 2008.

PROFESSIONAL SERVICE ACTIVITIES (Discipline-based)

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| Editorial Board: | Bioinfo Publications Editorial Board, 2010 - present |
| Associate Editor: | Journal of Statistics and Mathematics, 2010 - present |
| Advisory Board Member: | Scientific Journals International (SJI), 2006 – present. |
| Council Member | Council on Undergraduate Research, June 2012 – May 2015 |
| Vice Chair of MAA-NJ Secretary | (for Student Activities) Fall 2010 – present. MAA (Mathematical Association of America) New Jersey Section, spring 2000 – present |
| Co-Director | MAA-New Jersey Section Garden State Undergraduate Mathematics Conference (GSUMC), 2009 - Present |
| Director | SUMMA Summer REU in Mathematics at MSU funded by NSF, NSA Moody’s Foundation, summer 2008; |
| Director | MSU CURM research program funded by NSF/BYU, 2009/2010, 2007/2008 |
| Undergraduate Mentor | The National Alliance for Doctoral Studies in the Mathematical Sciences, 2009 - present |
| Mentor | AWM Mentor Network |
| Junior Faculty Mentor | AWM Mentor Grant 2011 |
| Active Referee for | <i>Communications in Algebra</i> <i>Discrete Dynamical Events</i> <i>Chinese Academia Sinica</i> <i>Houston Journal of Mathematics</i> <i>Linear Algebra and Its Applications</i> <i>Semigroup Forum</i> <i>Mathematics and Computer Education</i> <i>Arabian Journal for Science & Engineering</i> <i>International Journal of Math. & Math. Sciences</i> <i>International Journal of Applied Mathematics & Statistics</i> <i>Discrete & Continuous Dynamic Systems</i> |
| Reviewer for | <i>Mathematics Reviews</i> |
| Course Reviewer | for Oregon Pre-engineering and Applied Sciences Study (OPAS), Educational Policy Improvement Center (EPIC), 2007 |
| Liaison Coordinator | MAA (Mathematical Association of America) New Jersey Section, fall 2006 – 2008 |
| NSF Panel Reviewer | NSF TUES Program, 2010; CCLI Program 2008; NSF STEM Program: 2007, 2008; NSF CSEMS Program, 2003, 2004; |
| Invited Panelist: | Mathematical Association of America (MAA) Annual National Meeting panel discussion: “ <i>Mathematics and Mathematicians in Emerging Nations</i> ”, Jan. 2007. |
| Conference (co-) Organizer: | <ul style="list-style-type: none"> • Garden State Undergraduate Mathematics Conference, New Jersey, March 2012, April 2011, April 2010 • Graph Theory Day 51 Conference, Montclair State University, May, 2006; |

- Nebraska Commutative Algebra Conference (NSF funded), Lincoln, Nebraska, May, 2005;
- South Central Algebra Conference, New Orleans, Louisiana, April, 2002.

Session Organizer/Chair:

- Special Session “Algebraic Structures over Commutative Rings”, AMS Southeastern Section Meeting, Tulane University, New Orleans, Oct. 13-14, 2012
- Special Session “Commutative Algebra”, AMS Central Meeting, UNL, Lincoln, NE, Oct. 2011
- Special Session “Combinatorics and Graph Theory”, International Conference on Interdisciplinary Mathematical & Statistical Techniques (IMST 2009), Plzeň, Czech Republic, May 23-26 2009
- Special session, “Algebraic Methods and Algorithms in Modeling Discrete Dynamical Systems”, the Sixth European Congress on Modeling & Simulation held in Ljubljana, Slovenia, Sept. 2007.

Program Committee:

The 11th International Conference on Technology of Collegiate Mathematics (ICTCM), New Orleans, 1998