

Patrick J. Morandi

Curriculum Vitae

December 2008

Degrees:

B. A., Mathematics, California State University, Sacramento, 1983

Ph.D., Mathematics, University of California, San Diego, 1988

Professional Positions:

Lecturer	University of Texas at Austin	1988 - 1989
Visiting Assistant Professor	Indiana University	1989 - 1990
Assistant Professor	New Mexico State University	1990 - 1993
Associate Professor	New Mexico State University	1993 - 1996
Visiting Professor	Indiana University	1996 - 1997
Associate Professor	New Mexico State University	1997 - 2000
Professor	New Mexico State University	2000 - present
Department Head	New Mexico State University	2006 - present

Research Interests:

Finite-dimensional division algebras, algebras with involution, noncommutative valuation theory, quadratic forms, algebraic geometry, universal algebra, point-set topology.

Mathematical Research Grant Support:

- Postdoctoral assistant, *Quadratic Forms, Division Algebras and Galois Cohomology*, National Science Foundation grant DMS-8996250, June 1989–May 1991.
- Principal investigator, *Noncommutative Prüfer Rings*, New Mexico State University minigrant #91-031, April 1991.
- Principal investigator, *Division Algebras and Valuation Theory*, National Science Foundation grant DMS-9024939, June 1991–May 1993.

- Principal investigator, *Error Correcting Codes and Division Algebras*, New Mexico State University minigrant #95-093, July 1995.
- Principal investigator, *Indecomposable Division Algebras*, New Mexico State University minigrant #96-019, May 1996.
- Principal investigator, *Clifford Algebras of Algebras with Involution*, New Mexico State University minigrant #98-036, May 1998.
- Mathematical Sciences Activity co-coordinator, *Title V – Developing Hispanic Serving Institutions Program*, Department of Education grant, five year grant commencing October 2000.
- Co-investigator, *Applications of Topology and Universal Algebra in Modal Logic*, Georgian-U.S. Bilateral Grants Program, two year grant commencing in September 2002.

Other Grant Support:

- Co-mathematics coordinator, *Title V–Developing Hispanic Serving Institutions Program* (Bahram Nassersharif, principal investigator), United States Department of Education, 2000–2005.
- Participant, *Mathematics & Science Educators for the Future* (Pat Baggett and Dave Finston, principal investigators), 1999–2002.
- Participant, *Mathematically Connected Communities* (Rick Scott, Karin Wiburg, Doug Kurtz, principal investigators), New Mexico Public Education Department, 2004–present.

Mathematical Research Publications:

1. *The Henselization of a valued division algebra*, Journal of Algebra **122** (1989), 232-243.
2. *Value functions on central simple algebras*, Transactions of the American Mathematical Society **315** (1989), 605-622.
3. *Integral Dubrovin valuation rings* (with A. Wadsworth), Transactions of the American Mathematical Society **315** (1989), 623-640.
4. *Baer orderings with noninvariant valuation ring* (with A. Wadsworth), Israel Journal of Mathematics **68** (1989), 241-255.
5. *An approximation theorem for Dubrovin valuation rings*, Mathematice Zeitschrift **207** (1991), 71-82.

6. *On Dubrovin valuation rings in crossed product algebras* (with D. Haile), Transactions of the American Mathematical Society **338** (1993), 723-752.
7. *Maximal orders over valuation rings*, Journal of Algebra **152** (1992), 313-341.
8. *Noncommutative Prüfer rings satisfying a polynomial identity*, Journal of Algebra **161** (1993), 324-341.
9. *Bézout orders and Henselization* (with D. Haile and A. Wadsworth), Journal of Algebra **173** (1995), 394-423.
10. *On defective division algebras*, pp. 359-367 in “*K-Theory and Algebraic Geometry: Connections with Quadratic Forms and Division Algebras*”, (editors B. Jacob and A. Rosenberg), Proceedings of Symposia in Pure Mathematics, Vol. 58, Part 2, American Mathematical Society, Providence, RI, 1995.
11. *Kummer subfields of tame division algebras* (with B. A. Sethuraman), Journal of Algebra **172** (1995), 554-583.
12. *Indecomposable division algebras with a Baer ordering* (with B. A. Sethuraman), Communications in Algebra **22** (1994), 5401-5418.
13. *Noncrossed product division algebras with a Baer ordering* (with B. A. Sethuraman), Proceedings of the American Mathematical Society **123** (1995), 1995-2003.
14. *Divisors on division algebras and error correcting codes* (with B. A. Sethuraman), Communications in Algebra **26** (1998), 3211-3221.
15. *Lie algebras, composition algebras, and the existence of cross products on finite dimensional vector spaces*, Expositiones Mathematicae **17** (1999), 63-73.
16. *Generalized cocycles with values in one-units of Henselian valued division algebras* (with B. A. Sethuraman), Journal of Algebra **224** (2000), 123-139.
17. *Decomposition of involutions on inertially split division algebras* (with B. A. Sethuraman), Mathematische Zeitschrift **235** (2000), 195-212.
18. *On the Tensor Product of Composition Algebras* (with J-M Pérez-Izquierdo and S. Pumplün), Journal of Algebra **243** (2001), 41-68.
19. *Hyperbolicity of algebras with involution and connections with Clifford algebras* (with D. Haile), Communications in Algebra **29** (2001), 5733-5753.
20. *The Priestley separation axiom for scattered spaces* (with G. Bezhanishvili and R. Mines), Order **19** (2002), 1-10.

21. *Scattered, Hausdorff-reducible, and Hereditarily Irresolvable spaces* (with G. Bezhanishvili and R. Mines), *Topology and its Applications* **132** (2003), 291-306.
21. *Division algebras with an anti-automorphism but with no involution* (with B.A. Sethuraman and J.-P. Tignol), *Advances in Geometry* **5** (2005), 485-495.
22. *Valuations on tensor powers of a division algebra* (with B.A. Sethuraman), *Journal of Algebra* **293** (2005), 385-394.
23. *Profinite completions and canonical extensions of Heyting Algebras* (with G. Bezhanishvili, M. Gehrke, and R. Mines), *Order* **23** (2006), 143-161.
24. *A Springer theorem for higher degree forms*, *Mathematische Zeitschrift* **256** (2007), 221-228.
25. *Topo-canonical completions of closure algebras and Heyting algebras* (with G. Bezhanishvili and R. Mines), *Algebra Universalis* **58**, No. 1, (2008), 1-34.

Educational Research Publications:

1. *Calculus instruction at New Mexico State University through weekly themes and cooperative learning* (with J. Alvarez, D. Finston and M. Gehrke), *Primus* **3** (1993), 83-98.
2. *Exploration, explanation, formalization: a three-step approach to proof* (with T. Hodgson), *Primus* **6** (1996), 49-58.
3. *Computing the Symmetry Groups of the Platonic Solids with the Help of Maple*, *Resonance* **9 (8)** (2004), 18-26.

Books:

1. *Field and Galois Theory*, Graduate Texts in Mathematics, Vol. 167, Springer-Verlag, New York, 1996.
2. *Mathematics Courses using Themes* (with J. Alvarez, M. Gehrke, D. Kurtz, R. Staffeldt), unpublished manuscript.
3. *The Classification of Wallpaper Patterns: From Group Cohomology to Escher's Tessellations*, unpublished manuscript.
4. *An Introduction to Abstract Algebra via Applications* (with D. Finston), submitted to Springer-Verlag, February 2005.

Invited Addresses:

- *Ostrowski's theorem for valued division algebras*, conference on quadratic forms and real algebraic geometry, Corvallis OR, 25 July 1986.
- *Ostrowski's theorem for valued division algebras*, American Mathematical Society Annual Meeting, special session on Brauer groups, San Antonio TX, 24 January 1987.
- *The Henselization of a valued division algebra*, conference on quadratic forms and division algebras, Berkeley CA, 17 October 1987.
- *Value functions and Dubrovin valuation rings on central simple algebras*, American Mathematical Society Far Western Meeting, special session on division algebras, Claremont CA, 12 November 1988.
- *Valuations on division algebras and Henselization*, colloquium talk, Carleton University, Ottawa Ontario, 15 November 1988.
- *Valuations on division algebras and Henselization*, seminar talk, Queens University, Kingston Ontario, 16 November 1988.
- *Value functions on central simple algebras*, American Mathematical Society Annual Meeting, session on associative rings, Phoenix AZ, 13 January 1989.
- *An approximation theorem for noncommutative valuation rings*, American Mathematical Society Central Meeting, special session on noncommutative algebra in geometry and arithmetic, Muncie IN, 28 October 1989.
- *Maximal orders over valuation rings*, joint University of Cincinnati and Indiana University algebra seminar talk, Cincinnati OH, 31 March, 1990.
- *Maximal orders over valuation rings*, conference in honor of Prof. Goro Azumaya, Bloomington IN, 23 May 1990.
- *Noncommutative Prüfer rings*, conference on Brauer groups and group representations, Oberwolfach Germany, 18 April 1991.
- *Maximal orders over valuation rings*, seminar talk, University of California, San Diego, San Diego CA, 9 July 1991.
- *Noncommutative Prüfer rings*, conference on Brauer groups, Pingree Park CO, 27 June 1991.
- *Noncommutative Prüfer rings*, American Mathematical Society Western Meeting, special session on quadratic forms, Santa Barbara CA, 9 November 1991.
- *Noncommutative Prüfer rings*, seminar talk, Indiana University, Bloomington IN, 25 June 1992.

- *Bézout maximal orders and Henselization*, American Mathematical Society Summer Workshop on Division Algebras and Quadratic Forms, Santa Barbara CA, 24 July 1992.
- *The use of computers in teaching linear algebra*, colloquium talk, Montana State University Bozeman MT, 30 November 1992.
- *Constructions and some major results in the theory of division algebras*, colloquium talk, California State University, Northridge, Northridge CA, 24 February 1993.
- *New proofs of some theorems of Galois theory*, seminar talk, California State University, Northridge, Northridge CA, 25 February 1993.
- *Kummer subfields of tame division algebras*, conference on Brauer groups, Pingree Park CO, 4 August 1993.
- *Noncrossed products and indecomposable division algebras with a Baer ordering*, seminar talk, Indiana University, Bloomington IN, 10 January 1994.
- *Noncrossed product division algebras with a Baer ordering*, American Mathematical Society Annual Meeting, special session on quadratic forms and division algebras, Cincinnati OH, 13 January 1994.
- *Using projects and themes in undergraduate mathematics courses*, California State University, Northridge Distinguished Visitor colloquium talk, Northridge CA, 21 April 1994.
- *Noncrossed products and indecomposable division algebras with a Baer ordering*, University of Southern California algebra seminar talk, Los Angeles CA, 10 October 1994.
- *Error correcting codes, algebraic geometry and finite dimensional division algebras*, California State University, Northridge algebra seminar talk, Northridge CA, 22 May, 1995.
- *Divisors on division algebras and error correcting codes*, International Workshop on Brauer Groups and Galois Groups, Haifa, Israel, 30 June 1996.
- *Algebras with involution, Hermitian forms, and algebraic groups*, colloquium talk, New Mexico State University, Las Cruces NM, 16 October 1997.
- *Algebras with involution that become hyperbolic over a given field extension*, NSF-CBMS Conference on division algebras, Ft. Collins CO, 14 June 1998.
- *Cross products on finite dimensional vector spaces*, colloquium talk, California State University, Northridge, Northridge, CA, 9 December 1998.

- *Hyperbolicity of algebras with involution and connections with Clifford algebras*, colloquium talk, Université Catholique de Louvain, Louvain-la-Neuve, Belgium, 11 June 1999.
- *Activity-based mathematics courses for future K-8 Teachers at New Mexico State University* (with Pat Baggett), Mathematical Association of America Annual Meeting, contributed paper session: Looking to our Future: Recruiting and Preparing the Next Generation of Mathematics Teachers, Washington, D.C., 22 January 2000.
- *Partnership program in mathematics for prospective and practicing K-8 teachers* (with Pat Baggett), Mathematical Association of America Annual Meeting, contributed paper session: The Role of Mathematicians in the Development of Mathematics Teachers and Their Students, Washington, D.C., 20 January 2000.
- *Tensor products of composition algebras*, colloquium talk, Université Catholique de Louvain, Louvain-la-Neuve, Belgium, 23 June 2000.
- *Hyperbolicity of algebras with involution and connections with Clifford algebras*, colloquium talk, Universität Regensburg, Regensburg, Germany, 14 July 2000.
- *Decomposition of involutions on inertially split division algebras*, American Mathematical Society Annual Meeting, special session on Algebras, Forms, and Algebraic Groups, 7 January 2002.
- *Graph-theoretic assignments in elementary mathematics*, Mathematics Education Institute Mini-conference, Las Cruces, NM, 17 March 2002.
- *Tensor products of composition algebras*, conference on Brauer Groups, Pingree Park, CO, 2 July 2002.
- *The use of projects and writing assignments in undergraduate mathematics courses at New Mexico State University*, colloquium talk, California State University, Northridge, Northridge CA, 4 December 2002.
- *The Priestley separation axiom for scattered spaces*, American Mathematical Society Annual Meeting, special session on the Many Lives of Lattice Theory, 17 January 2003.
- *Writing assignments at New Mexico State University*, colloquium talk, RWTH Aachen, Aachen, Germany, 17 June 2003.
- *Valuation theory of division algebras and applications to noncrossed products*, colloquium talk, RWTH Aachen, Aachen, Germany, 18 June 2003.
- *Valuation theory of division algebras and applications to noncrossed products*, seminar talk, University College Dublin, Dublin, Ireland, 22 September 2003.

- *Applications of valuation theory to noncrossed products and prime-to-p extensions*, seminar talk, Università Degli Studi di Trento, Trento, Italy, 27 October 2003.
- *Valuation theory of division algebras and applications to noncrossed products*, seminar talk, Université Catholique de Louvain, Louvain-la-Neuve, Belgium, 1 December 2003.
- *Valuations on tensor powers of division algebras*, seminar talk, Indiana University, Bloomington, IN, 1 March 2004.
- *Valuations on tensor powers of division algebras*, seminar talk, Oberseminar zur Algebrentheorie, Universität Regensburg, Regensburg, Germany, 27 May 2004.
- *A Springer theorem for higher degree forms*, seminar talk, Oberseminar zur Algebrentheorie, Universität Regensburg, Regensburg, Germany, 3 June 2004.
- *Division Algebras With an Anti-Automorphism but no Involution*, colloquium talk, New Mexico State University, Las Cruces, NM, 23 September 2004.
- *Division Algebras With an Anti-Automorphism but no Involution*, colloquium talk, California State University, Northridge, Northridge, CA, 16 November 2004.
- *Division Algebras With an Anti-Automorphism but no Involution*, American Mathematical Society Annual Meeting, special session on Division Algebras, Galois Theory, Cohomology and Geometry, San Antonio, TX, 12 January 2006.
- *Valuations on Tensor Powers of Division Algebras*, American Mathematical Society Annual Meeting, special session on Division Algebras, Galois Theory, Cohomology and Geometry, San Antonio, TX, 12 January 2006.
- *Completions of Lattices*, conference on Brauer Groups, June 30-July 4 2008, Pingree Park, CO.

Other Educational Talks:

- *Differentiation skills exams in calculus courses*, Annual meeting of the Southwestern section of the Mathematical Association of America, New Mexico State University, Las Cruces NM, 5 April 1991.
- *Differentiation skills exams in calculus courses*, New Mexico State University teaching seminar talk, Las Cruces NM, 20 April 1992.
- *The use of computers in teaching linear algebra*, colloquium talk, New Mexico State University, Las Cruces NM, 11 November 1993.

Other Talks:

- University of California, San Diego, three seminar talks while a graduate student.
- University of Texas at Austin, two seminar talks while in residence.
- Indiana University, several seminar talks while in residence.
- University of California, Santa Barbara, two seminar talks while in residence.
- New Mexico State University, numerous seminar talks.

Other Professional Meetings Attended:

- American Mathematical Society Annual Meeting, San Francisco CA, January 1991.
- Mathematical Association of America annual meeting of the southwestern section, Las Cruces NM, April 1991.
- New Mexico State University holiday symposium, Las Cruces NM, December 1992.
- American Mathematical Society Annual Meeting, San Francisco CA, January 1995.
- Southwest RIMS conference, Tucson AZ, February 1995.
- Southern California Algebra Conference, Northridge CA, October 1995.
- Mini-cours sur les groupes de Chow, variétés de Severi-Brauer et cohomologie galoisienne, Université d'Artois, Lens, France, May 1996.
- Euroconference on linear algebraic groups and related structures, Louvain-la-Neuve, Belgium, June 1996.
- Brauer groups, Pingree Park conference center of Colorado State University, July 1997.
- European Autumn School on the Hasse Principle and Algebraic Groups, Université d'Artois, Lens, France, October 1997.
- Minicourse on involutions and algebraic groups, Université d'Artois, Lens, France, June 1999.
- Minicourse on Geometric Methods in the Theory of Quadriatic Forms, Université d'Artois, Lens, France, June 2000.
- Minicourse on Quadratic Forms and Witt Groups, Université d'Artois, Lens, France, June 2001.
- Minicourse on Quadratic Forms, Université d'Artois, Lens, France, June 2003.

- Workshop on Algebraic Groups, Quadratic Forms and Related Topics, Université de Franche-Comté, Besançon, Besançon, France, July 2003.
- International Conference on Algebraic and Topological Methods in Non-Classical Logics, Tbilisi State University, Tbilisi, Georgia, July 2003.
- Minicourse on Quadratic Forms, Université d'Artois, Lens, France, June 2004.
- Workshop on K-Theory, Algebraic Groups and Related Structures, University College, Dublin, Dublin, Ireland, July 2004.
- Minicourse on Quadratic Forms, Université d'Artois, Lens, France, June 2006.
- American Mathematical Society/Mathematical Association of America Annual Meeting, New Orleans LA, January 2007.
- Minicourse on Quadratic Forms, Triangulated Categories and Valuations, Université d'Artois, Lens, France, June 2007.
- American Mathematical Society/Mathematical Association of America Annual Meeting, San Diego CA, January 2008.
- American Mathematical Society/Mathematical Association of America Annual Meeting, Washington D.C., January 2009.

Professional Activities:

- Member, American Mathematical Society
- Member, Mathematical Association of America
- Reviewer, Mathematical Reviews, 1990 - present
- Reviewer, National Science Foundation Grant Proposals, 1993, 1994, 2000
- Reviewer, Fondo Nacional de Investigacion Cientifica Y Techologica, Chile, 2004
- Referee, Communications in Algebra, 1989, 1993, 1994, 1995, 1996, 1997, 2003, 2004
- Referee, Transactions of the American Mathematical Society, 1989, 1990
- Referee, Contemporary Mathematics, 1990
- Referee, Journal of Algebra, 1991, 1992, 1995, 1996, 1997, 2003, 2004
- Referee, Proceedings of the American Mathematical Society, 1992, 1993, 1994, 1995, 1998, 2000, 2003

- Referee, Israel Journal of Mathematics, 1993
- Referee, Mathematische Nachrichten, 1994
- Referee, Scientia Iranica, An International Journal of Science and Technology, 1996
- Referee, Journal of Sciences, Islamic Republic of Iran, 1996
- Referee, Proyecciones Revista De Matematica, 1996
- Referee, Bulletin of the Canadian Mathematical Society, 1997
- Referee, Linear and Multilinear Algebra, 1997
- Referee, Mathematics Results, 1997
- Referee, American Mathematical Monthly, 1999
- Referee, Algebra Colloquium, 2000
- Referee, Manuscripta Math., 2002

Department of Mathematical Sciences Activities:

- Ph.D. Thesis supervision of Jean-Bernard Nganou.
- Ph.D. Thesis supervision of Douglas Larmour. Ph.D. completed in Summer 1999. Thesis title: *A Springer Theorem for Hermitian Forms and Involutions*. Head, Ph.D. oral comprehensive examination, Spring 1996.
- Ph.D. Thesis supervision of Yan-Wen Wang. Head, Ph.D. oral comprehensive examination, Spring 1997.
- Chair, Teaching Committee, 2004–present.
- Chair, Undergraduate Curriculum Committee, 1997–2003.
- Member, Advisory Committee, 1999–2003, 2005.
- Member, Promotion to Professor Subcommittee, 2002.
- Member, Ad-hoc Committee on Hiring, 1999–2000.
- Member, Tenure and Promotion to Associate Professor Committee, 1998–1999.
- Member, Department Head Search Subcommittee, 1997–1998.
- Co-writer of algebra comprehensive exam, 1991, 1993, 1994, 1995, 1998, 1999, 2000, 2001, 2003, 2005.

- Organizer and/or participant in the algebra seminar, 1990–present.
- Member, Graduate Studies Committee, 1993–1994.
- Member, Undergraduate Majors and Minors Committee, 1994–1996.
- Member, Arts and Sciences Advising Committee, 1991–1996.
- Member, Computer Advising Committee, 1991–1992, 1995–1996.
- Member, Student Honors Committee, 1991–1992.
- Member, Social Committee, 1992–1996.
- Chair, Social Committee, 1995–1996.
- Member, ad-hoc committee to choose linear algebra texts, 1991.
- Course coordinator:

Math 280, Spring 1993, Fall 1993, Fall 1995

Math 279, Spring 1994, Spring 1995

Math 191, Fall 1994, Spring 1998

Math 210G, Spring 1999

Math 112G, Fall 2000

Math 111, Fall 2004

Math 111, Fall 2005

University Activities:

- Advisor, College of Arts and sciences, 1991–1996.
- Dean’s representative, master’s oral examination, computer science, Spring 1992.
- Dean’s representative, master’s oral examination of Manish Mamnani in computer science, Summer 1994.
- Dean’s representative, master’s oral examination of Quo-qing Tian in computer science, Fall 1995.
- Dean’s representative, master’s oral examination in Industrial Engineering, Fall 1997.
- Dean’s representative, master’s oral examination in Electrical Engineering, Spring 2003.

- Ad-hoc university committee for revising course requirements to satisfy entry-level Teacher Competencies, Fall 1999–Spring 2000.
- Dean’s representative, master’s oral examination of Stuart Wilber in Electrical Engineering, August 2001.
- Promotion and Tenure Committee, Biology, 2001–2003.
- Promotion to Professor Committee, Computer Science, 2004–2005.
- Mentor, NMSU Advance Program, 2004–2007.
- College Planning and Budget Committee, 2007-present.
- College of Education Council Member, 2006-present.

Courses Taught:

Courses at New Mexico State University:

- Math 111 - Fundamentals of Elementary Mathematics I
- Math 112G - Fundamentals of Elementary Mathematics II
- Math 191 - Calculus and Analytic Geometry I
- Math 192 - Calculus and Analytic Geometry II
- Math 210G - Mathematics Appreciation
- Math/Hon 275G - Spirit and Evolution of Mathematics
- Math 279 - Introduction to Finite Mathematics
- Math 280 - Introduction to Linear Algebra
- Math 330 - Discrete Mathematics
- Math 331 - Introduction to Modern Algebra
- Math 431 - Algebraic Coding Theory
- Math 481/526 - Modern Algebra I
- Math 482/527 - Modern Algebra II
- Math 505 - Elementary Number Theory (for Gadsden teachers)

- Math 581 - Field Theory
- Math 582 - Commutative and Noncommutative Algebra
- Math 601 - Algebraic Geometry
- Math 601 - Error Correcting Codes and Algebraic Curves
- Math 683 - Homological Algebra
- Math 687 - Topics in Ring Theory

Courses at Universities other than New Mexico State:

University of Texas at Austin:

- Math 311 - Linear Algebra, Spring 1989
- Math 343K - Abstract Algebra, Fall 1989
- Math 403L - Business Calculus II, Fall 1989
- Math 808B - Engineering Calculus II, Spring 1989

Indiana University:

- Math 118 - Finite Mathematics, Spring 1990
- Math 119 - Business Calculus, Fall 1989
- Math T403 - Abstract Algebra for Secondary Teachers, Fall 1996