

CURRICULUM VITAE

Michael K. Kinyon

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1. Education

Ph.D.	Mathematics	1991	University of Utah
M.S.	Mathematics	1988	University of Utah
B.S. (Honors)	Mathematics	1986	University of Utah

2. Professional Experience

University of Denver, Department of Mathematics

2007-present: Associate Professor

2006-2007: Assistant Professor

Indiana University South Bend, Department of Mathematical Sciences

2004-2006: Professor

1998-2004: Associate Professor

1992-1998: Assistant Professor

Western Michigan University, Department of Mathematics

2001-2003: Associate Professor

University of Utah, Department of Mathematics

1991-1992: Associate Instructor

1988-1991: Teaching Fellow

1986-1988: Teaching Assistant

Short-Term Visiting Appointments.

- July 9–July 13, 2001: Faculty of Mathematics, University of Hamburg, Germany
- June 13–July 13, 2004: Mathematics Institute, University of Santiago de Compostela, Spain
- July 13–July 27, 2004: Department of Algebra, Charles University, Prague, Czech Republic
- May 11–May 25, 2005: Department of Algebra, Charles University, Prague, Czech Republic
- May 28–June 28, 2005: Mathematics Institute, University of Santiago de Compostela, Spain

3. Research Grants

- 1993 IUSB Summer Faculty Fellowship (\$5000).
- 1999 IUSB Faculty Research Grant (\$8000).

4. Honors/Awards

- 1998 IUSB Teaching Excellence Recognition Award.
- 1988 University of Utah Department of Mathematics Outstanding Teaching Assistant Award.
- 1985 Phi Beta Kappa.

5. Publications

Books.

Edited.

G. Van Brummelen and M. K. Kinyon (eds.), *Mathematics and the Historian's Craft: the Kenneth O. May Lectures*, CMS Books in Mathematics **21**, Springer Verlag, 2005.

Refereed Research Articles: Journals.

Appeared.

- [1] (with R.N. Bryan and D.H. Tucker) Coupled linear operators, *Results Math.* **15** (1989), 1–14.
- [2] The adjoint problem for coupled linear operators, *Results Math.* **18** (1990), 60–73.
- [3] (with W.J. Coles) Summability methods for oscillation of linear second-order matrix differential equations, *Rocky Mountain J. Math.* **24** (1994), 19–36.
- [4] (with A.A. Sagle) Automorphisms and derivations of ordinary differential equations and algebras, *Rocky Mountain J. Math.* **24** (1994), 135–154.
- [5] (with A.A. Sagle) Quadratic dynamical systems and algebras, *J. Differential Equations* **117** (1995), 67–126.
- [6] (with N.C. Hopkins) Automorphism eigenspaces of quadratic differential equations and qualitative theory, *Differential Equations Dynam. Systems* **5** (1997), 121–138.
- [7] (with S. Walcher) On ordinary differential equations admitting a finite linear group of symmetries, *J. Math. Anal. and Appl.* **216** (1997), 180–196.
- [8] (with N.C. Hopkins) Quadratic differential equations in \mathbb{Z}_2 -graded algebras, *Trans. Amer. Math. Soc.* **351** (1999), 4545–4559.
- [9] Global left loop structures on spheres, *Comment. Math. Univ. Carolinae* **41** (2000), 325–346.
- [10] (with A.M. Bloch and S.V. Drakunov) Stabilization of nonholonomic systems using isospectral flows, *SIAM J. Control Optim.* **38** (2000), 855–874.
- [11] (with A.A. Ungar) The gyro-structure of the complex unit disk, *Math. Mag.* **73** (2000), 273–284.
- [12] (with O. Jones) Loops and semidirect products, *Comm. Algebra* **28** (2000), 4137–4164.
- [13] (with D.L. Alvis) Birkhoff's Theorem for panstochastic matrices, *Amer. Math. Monthly* **108** (2001), 28–37.
- [14] (with A. Weinstein) Leibniz algebras, Courant algebroids, and multiplications on homogeneous spaces, *Amer. J. Math.* **123** (2001), 525–550.

- [15] (with K. Kunen and J.D. Phillips) Every diassociative A-loop is Moufang, *Proc. Amer. Math. Soc.* **130** (2002), 619–624.
- [16] (with A.A. Sagle) Nahm algebras, *J. Algebra* **247** (2002), 269–294.
- [17] (with J.D. Phillips) A note on trimedial quasigroups, *Quasigroups and Related Systems* **9** (2002), 65–66.
- [18] (with K. Kunen and J.D. Phillips) A generalization of Moufang and Steiner loops, *Algebra Universalis* **48** (2002), 81–101.
- [19] (with O. Chein, A. Rajah, and P. Vojtěchovsky) Loops and the Lagrange property, *Results Math.* **43** (2003), 74–78.
- [20] (with J.D. Phillips) Commutants of Bol loops of odd order, *Proc. Amer. Math. Soc.* **132** (2004), 617–619.
- [21] (with K. Kunen and J.D. Phillips) Diassociativity in conjugacy closed loops, *Comm. Algebra* **32** (2004), 767–786.
- [22] (with J.D. Phillips) Axioms for trimedial quasigroups, *Comment. Math. Univ. Carolinae* **45** (2004), 287–294.
- [23] (with H. Kiechle) Infinite simple Bol loops, *Comment. Math. Univ. Carolinae* **45** (2004), 275–278.
- [24] (with K. Kunen) The structure of extra loops, *Quasigroups and Related Systems* **12** (2004), 39–60.
- [25] (with J.D. Phillips) Rectangular loops and rectangular quasigroups, *Comput. Math. Appl.* **49** (2005), 1679–1685.
- [26] (with J.D. Phillips and P. Vojtěchovský) Loops of Bol-Moufang type with a subgroup of index two, *Bul. Acad. Științe Repub. Mold. Mat.* **3**(49) (2005), 71–87.
- [27] (with M. Aschbacher and J.D. Phillips) Finite Bruck loops, *Trans. Amer. Math. Soc.* **358** (2006), 3061–3075.
- [28] (with J.D. Phillips and T. Foguel) On twisted subgroups and Bol loops of odd order, *Rocky Mountain J. Math.* **36** (2006), 183–212.
- [29] (with K. Kunen) Power-associative, conjugacy closed loops, *J. Algebra* **304** (2006), 679–711.
- [30] Leibniz algebras, Lie racks, and digroups, *J. Lie Theory* **17** (2007), 99–114.
- [31] (with J.D. Phillips and P. Vojtěchovský) C-loops: extensions and constructions, *J. of Algebra and its Applications* **6** (2007), 1–20. [math.GR/0412390](#)

Accepted.

- [32] (with T. Kepka and J.D. Phillips) The structure of F-quasigroups, *J. Algebra*, to appear, [math.GR/0510298](#)
- [33] (with J.D. Phillips and P. Vojtěchovský) When is the commutant of a Bol loop a subloop?, *Trans. Amer. Math. Soc.*, to appear, [math.GR/0601363](#)
- [34] (with T. Kepka and J.D. Phillips) F-quasigroups isotopic to groups, *Algebra Universalis*, accepted pending revision, [math.GR/0601077](#)

Submitted.

- [35] (with P. Vojtěchovský) Primary decompositions in varieties of commutative diassociative loops, [math.GR/0702874](#)
- [36] (with K. Pula and P. Vojtěchovský) Admissible orders of Jordan loops, [math.GR/0705.3445](#)
- [37] (with P. Csorgó and A. Drápal) Buchsteiner loops, [math.GR/0708.2358](#)
- [38] (with K. Kunen and J.D. Phillips) Strongly right alternative rings and Bol loops, [math.RA/0508005](#)
- [39] (with T. Kepka and J.D. Phillips) F-quasigroups and generalized modules, [math.GR/0512244](#)

Refereed Research Articles: Proceedings Volumes.Appeared.

- [37] (with A.A. Sagle) Differential systems and algebras, in *Control Theory, Dynamical Systems and Geometry of Dynamics*, K.D. Elworthy, W.N. Everitt, and E.B. Lee (eds.), Lecture Notes in Pure and Appl. Math. 152, Marcel Dekker, 1994, pp. 115–141.
- [38] Quadratic differential equations on graded structures, in *Nonassociative Algebra and Its Applications*, S. Gonzalez (ed.), Math. Appl. 303, Kluwer Academic Publishers, 1994, pp. 215–218.
- [39] (with A.A. Sagle) Quadratic systems, blow-up, and algebras, in *Nonassociative Algebra and Its Applications*, S. Gonzalez (ed.), Math. Appl. 303, Kluwer Academic Publishers, 1994, pp. 367–371.
- [40] (with A.M. Bloch and S.V. Drakunov) Stabilization of Brockett’s generalized canonical driftless system, in *Proceedings of the 36th IEEE Conference on Decision and Control*, 1997, pp. 4260–4265.
- [41] (with A.M. Bloch and S.V. Drakunov) Nonholonomic stabilization and isospectral flows, in *Proceedings of the 37th IEEE Conference on Decision and Control*, 1998, pp. 3581–3586.

Refereed Pedagogical Articles.

- [42] A note on an “unnatural” isomorphism, *Pi Mu Epsilon J.* **10** (Fall 1997), pp. 525–527.
- [43] Solution to Problem #641, *College Math J.* **31** (2000), pp. 63–64.
- [44] Solution to Problem #1626, *Math. Mag.* **75** (2002), p. 231.

Unrefereed Articles.

- [45] (with H.C. Myung and A.A. Sagle) Quadratic differential equations, in *Hadronic Mechanics and Nonpotential Interactions 5 - Part I. Mathematics*, H.C. Myung (ed.), Nova Science, 1991, pp. 197–204,
- [46] (with A.A. Sagle) Quadratic dynamical systems, in *Nonassociative Algebras and Related Topics*, K. Yamaguti and N. Kawamoto (eds.), World Scientific, 1992, pp. 101–114,

Unpublished Articles.

- [47] Operational quantities associated to bounded linear operators on normed vector spaces, [math.FA/0108124](#) (last revised: August 2001, original version: IUSB Technical Report M090695-1)

Manuscripts in Preparation.

- (with A. Krapež and J. D. Phillips) Right product quasigroups
- (with A. Drápal) Buchsteiner loops: associators and constructions
- (with K. Kunen) Locally compact loops; Conjugacy-closed 2-loops
- (with M. Ladra) Cotriple (co)homology of augmented racks
- (with N. Albin and A.A. Sagle) The Nahm equations, gradient systems, and nonassociative algebras
- (with C. Ahlbrandt) The symplectic geometry of Prüfer transformations

Research in Progress.

- The coquecigrue problem for Leibniz algebras.
- (with K. Kunen and J.D. Phillips) (i) A-loops, (ii) Osborn loops

6. Presentations**Presentations at Professional Meetings.**

(*) indicates an invited address.

Nov. 13, 1992: “Quadratic Differential Equations with Automorphisms of Finite Order,” Midwest-Southeastern Atlantic Second Joint Regional Conference on Differential Equations, University of Kentucky, Louisville, KY.

July 17, 1993: “Quadratic Differential Equations and Graded Structures,” Third International Conference on Nonassociative Algebra and Its Applications, Oviedo, Spain.

May 1994: “Difference Equations and Algebras,” First International Conference on Difference Equations, Trinity University, San Antonio, TX.

(*) Nov. 12, 1994: “Gyrogroups, Symmetric Spaces, and Lie Triple Systems,” Special Session on Nonassociative Algebras, 896th Meeting of the American Mathematical Society, University of Richmond, Richmond, VA.

Oct. 22, 1995: “Algebraic Structures Arising from the ER Decomposition,” Third Matrix Symposium, Western Michigan University, Kalamazoo, MI.

May 31, 1996: “Ordinary Differential Equations Admitting Finite Linear Symmetry Groups,” First International Conference on Differential Equations and Dynamical Systems, Southwest Missouri State University, Springfield, MO.

(*) Sept. 27, 1997: “Gyrogroups and Non-Euclidean Geometry,” Special Session on Non-Euclidean and Spacetime Geometry, Meeting of the American Mathematical Society, Montreal, Quebec, Canada.

Nov. 7, 1997: “Stabilization of Brockett’s Generalized Canonical Driftless System”, Third Midwest-Southeastern Atlantic Joint Regional Conference on Differential Equations, Vanderbilt University, Nashville, TN.

Jan. 16, 1999: “Stabilization of Nonholonomic Systems Using Isospectral Flows,” AMS Session on Differential Equations & Dynamical Systems, Joint Mathematics Meeting, San Antonio, TX.

May 6-8, 1999: “Stabilization of Nonholonomic Systems Using Isospectral Flows” (Poster), Michigan Interdisciplinary Mathematics Meeting II, University of Michigan, Ann Arbor, MI.

(*) July 29, 1999: “Global Left Loop Structures on Spheres,” Loops99 Conference, Prague, Czech Republic.

Oct. 16, 1999: “How To Add Vectors,” Fall Meeting of the Indiana Section of the MAA, Valparaiso University, Valparaiso, IN.

(*) Jan. 15, 2000: “A Loop Structure on the Complex Hyperbolic Plane,” Special Session on Complex Hyperbolic Geometry and the Heisenberg Group, Joint Mathematics Meetings, Washington, D.C.

April 8, 2000: “From Bol to Bruck,” Special Session on Quasigroups, Loops, and their Applications, Central Section AMS Meeting, University of Notre Dame, Notre Dame, IN.

Jan. 11, 2001: “Euler and Some Paradoxes of Integral Calculus,” MAA Session on The Mathematics of Euler and His Times, Joint Mathematics Meetings, New Orleans, LA.

May 25, 2001: “The Early History of Quasigroup/Loop Theory,” Annual Meeting of the CSHPM, University of Laval, Quebec City, Quebec, CA.

(*) Jan. 8, 2002: “Oscillation of 2nd Order, Linear, Matrix Differential Equations on Measure Chains”, Special Session on Dynamic Equations on Time Scales, Joint Mathematics Meetings, San Diego, CA.

(*) Jan. 2003: “Symplectic Geometry of Prüfer Transformations,” Special Session on Discrete Dynamics and Difference Equations, Joint Mathematics Meetings, Baltimore, MD.

(*) Aug. 4, 2003: “The Cocquecigrue of a Leibniz Algebra,” AlanFest (conference in honor of the 60th birthday of Alan Weinstein), Erwin Schrödinger Institute, Vienna, Austria.

(*) Aug. 8-10, 2003: “Introduction to Smooth Loops I, II, III” Loops’03 Workshop, Czech Agricultural University, Prague, Czech Republic.

(*) Aug. 14, 2003: “Loop Isotopes of F-Quasigroups and their Paramedial-like Analogs,” Loops’03, Czech Agricultural University, Prague, Czech Republic.

Jan. 7, 2004: “The Cocquecigrue of a Leibniz Algebra,” Joint Mathematics Meetings, Phoenix, AZ.

(*) May 23, 2005: “Generalizations of F-quasigroups and semimedial quasigroups,” Workshop on Nonassociative Binary Systems of nonLie Type, Charles University, Prague, Czech Republic,

(*) July 9, 2005: “A Survey of Osborn Loops”, Plenary Address, Mile High Conference on Loops, Quasigroups, and Nonassociative Systems, Denver, CO.

(*) June 23, 2006: “Loop theory problems for which automated deduction might be useful”, ADAM 2006, Albuquerque, NM.

June 22, 2007: “A variety containing quasi-Hilbert algebras”, ADAM 2007, Albuquerque, NM.

Aug. 23, 2007: “Buchsteiner loops”, LOOPS07, Prague, Czech Republic.

(*) Jan. 8, 2008: TBA, Special Session on Representation Theory and Nonassociative Algebra, Joint Mathematics Meetings, San Diego, CA.

(*) June 23-27 2008: TBA, Conference on Hermitian symmetric spaces, Jordan algebras and related problems, CIRM, Luminy, France.

Colloquia and Other Invited Presentations.

Oct. 2, 1992: “From Magic Squares to Symmetric Spaces,” Colloquium, Indiana State University, Terre Haute, IN.

Mar. 11, 1994: “The Complex Unit Disk,” Colloquium, Indiana University South Bend, South Bend, IN.

June 12, 1997: “Gyrogroups: A Generalization of Groups,” Colloquium, Indiana State University, Terre Haute, IN.

- March 12, 1998: “Chaos: The Hying of an Old Science,” Deans’ Seminar, Indiana University South Bend, South Bend, IN.
- March 10, 2000: “Differential Equations and Algebras,” Colloquium, Northeastern Illinois University, Chicago, IL.
- May 31, 2000: “Smooth Loops, Differential Geometry, and Spheres,” Differential Geometry Seminar, University of California, Berkeley, CA.
- Oct. 19, 2000: “Leibniz algebras, Courant algebroids, and multiplications on homogeneous spaces,” Colloquium, Western Michigan University, Kalamazoo, MI.
- Feb. 9, 2001: “How To Add Vectors,” Colloquium, Union College, Schenectady, NY.
- Feb. 23, 2001: “How To Add Vectors,” Colloquium, Southeastern Louisiana University, Hammond, LA.
- March 9, 2001: “Differential Equations and Algebras,” Colloquium, Western Michigan University, Kalamazoo, MI.
- March 17, 2001: “How To Add Vectors,” Colloquium, Coker College, Hartsville, SC.
- Nov. 2, 2001: “How To Add Vectors,” Pi Mu Epsilon Colloquium, Western Michigan University, Kalamazoo, MI.
- Nov. 5, 2002: “How To Add Vectors,” Colloquium, Wabash College, Crawfordsville, IN.
- Nov. 21, 2002: “Differential Equations and Algebras,” Colloquium, University of Wyoming, Laramie, WY.
- Nov. 22, 2002: “Loops, Quasigroups, and Automated Reasoning,” Joint Discrete Mathematics Seminar, Colorado State University, Ft. Collins, CO.
- Oct. 31, 2003: “Adventures in Automated Reasoning,” Pi Mu Epsilon Colloquium, Western Michigan University, Kalamazoo, MI.
- July 6, 2004: “The Coquecigrue of a Leibniz Algebra: Recent Progress,” Institute of Mathematics Colloquium, University of Santiago de Compostela, Spain.
- June 20, 2005: “Quasigroups, Loops, and Automated Reasoning” Institute of Mathematics Colloquium, University of Santiago de Compostela, Spain.
- Nov. 11, 2006: “Coquecigrues of Leibniz algebras: a Survey of Recent Progress,” Operads 2006, Institut de Recherche Mathématique Avancée, Strasbourg, France.
- Oct. 19, 2007: TBA, Department of Mathematics Colloquium, Auburn University Montgomery, AL.

7. Professional Affiliations

American Mathematical Society, Mathematical Association of America, Canadian Society for the History and Philosophy of Mathematics.

8. Professional Service

Editing.

- 2004-Present: Member of the Editorial Board of *Quasigroups and Related Systems*
- 2006-Present: Member of the Editorial Board of the *Journal of Generalized Lie Theory and Applications*
- 2003-2005: Editor of “Classroom Capsules” section of the *College Mathematics Journal*

- 2000-2002: Editor of the *Proceedings of the Canadian Society for History and Philosophy of Mathematics*, published annually. (Also served on the Society's Executive Council.)
- Co-editor (with A. Drapal and O. Chein) of a special issue of *Comment. Math. Univ. Carolin.* **41** (2000), no. 2: the Proceedings of *Loops99*.
- Co-editor (with A. Drapal and J.D. Phillips) of a special issue of *Comment. Math. Univ. Carolin.* **45** (2004), no. 2: the Proceedings of *Loops03*.
- Co-editor (with A. Drapal and J.D. Phillips) of a special issue of *Comment. Math. Univ. Carolin.* (2008), no. 2: the Proceedings of *Loops07*.

Refereeing and Reviewing.

- Refereed for *Memoirs of the AMS*, *Proc. AMS*, *J. Algebra* (4 times), *Comm. Algebra*, *Math. Proc. Camb. Phil. Soc.* (twice), *Amer. Math. Monthly*, *Rocky Mountain J. Math.*, *J. Lie Theory* (twice), *J. Comput. Appl. Math.*, *Discrete Math.* (3 times), *Qualitative Theory of Diff. Eq., Dyn. Contin. Discrete Impuls. Syst.*, *Comment. Math. Univ. Carolin.* (4 times), *IMA Journal of Applied Mathematics*, *Found. Phys.* (3 times), *Pi Mu Epsilon J.* (3 times), *Bull. Malays. Math. Sci. Soc.*, *J. Pure Appl. Algebra*, *J. Anal. Appl.*, *Semigroup Forum*, *J. Algebra Appl.*, *Mediterranean J. Math.*, *Quasigroups & Related Systems* (twice)
- Reviewer for *Mathematical Reviews*

Organization of Conferences/Workshops/Etc.

- Program Committee, *Loops99*, Czech Agricultural University, Prague, Czech Republic, July 27-30, 1999.
- Co-organizer (with J.D. Phillips) of the Special Session on Quasigroups and Loops and their Applications, Central Section Meeting of the AMS, Notre Dame, IN, April 7-9, 2000.
- Program Committee, *Loops03*, Czech Agricultural University, Prague, Czech Republic, Aug. 10-17, 2003.
- Program Committee, *Loops07*, Czech Agricultural University, Prague, Czech Republic, Aug. 19-25, 2007.

Other Professional Service.

- List owner of *LoopForum*, an email group for discussions of quasigroups, loops, & related topics.
- 1999-2001: Webmaster for Indiana Conference of AAUP.

Department and University Service.

- 2003-2005: Graduate Director, IUSB Masters Program in Applied Mathematics and Computer Science
- 1997-2001, 2002-2003: Faculty Advisor for the IUSB Student Chapter of the MAA.
- 1998-2001: MAA Liaison for IUSB.
- 1997-2001, 2002-2003: Co-organizer of IUSB Math/Physics Seminar.
- 1995-2001: Webmaster for Dept. of Mathematics & Computer Science, IUSB.
- Departmental and College committees, too numerous to list or even count.

9. Teaching Activities

Theses Supervised.

- Amanda K. Schermer, Dynamics of quadratic maps on 2×2 matrices, IUSB Honors Thesis, 1998. See <http://www.iuinfo.indiana.edu/homepages/0124/0124text/smart.htm>
- Dean L. Johnson, Generalizations of Cavalieri's Principle and Pappus' Theorem, IUSB Honors Thesis, 1998.

Courses Taught.

University of Denver.

Graduate: Lie Groups & Lie Algebras
Undergraduate: Calculus I, II, III

Indiana University South Bend.

Graduate: Control Theory
Undergraduate: Precalculus; Trigonometry; Finite Mathematics; Brief Survey of Calculus; Calculus (regular, honors); Linear Algebra; Discrete Mathematics; Ordinary Differential Equations; Partial Differential Equations; History of Mathematics; Introduction to Analysis I & II; Complex Variables; Reading Courses: Difference Equations, Fractal Geometry

Western Michigan University.

Graduate: Partial Differential Equations
Undergraduate: Calculus; Differential Equations & Linear Algebra; Reading Course: Integral Equations

University of Utah.

Intermediate Algebra, College Algebra, Calculus (regular, honors), Ordinary Differential Equations (engineers), Partial Differential Equations (engineers), Linear Algebra and Multivariable Calculus (engineers), Introduction to Analysis (secondary education majors).

10. Personal Data

- Born March 24, 1964 in Santa Barbara, CA.
- Married (Kamila Kinyon), two children (Carl, Rebecca).