

*Curriculum Vita*

LEWIS D. LUDWIG

Department of Mathematics and Computer Science

Denison University

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**Education**

**Ohio University**

Athens, Ohio

Ph.D. in Mathematics

March 2001

Thesis title: "Topological separation axioms:  $\alpha$ -normal and  $\beta$ -normal"

Thesis supervisor: Alexander V. Arhangel'skii

**Miami University**

Oxford, Ohio

Masters of Science in Mathematics

May 1995

**College of Mount St. Joseph**

Cincinnati, Ohio

Masters of Education

August 1995

Bachelor of Arts in Mathematics

May 1993

Bachelor of Science in Computer

May 1991

Information and Business Administration

**Research Publications and Preprints**

- Foisy, Joel; Ludwig, Lewis D., *When graph theory meets knot theory*, to appear in Contemporary Mathematics, AMS.
- Liu, Chuan; Lin, Shou; Ludwig, Lewis D., *Spaces with a  $\sigma$ -point-discrete Weak Bases*, Tsukuba J. Math., **32** (2008), no.1, 165-177.
- Liu, Chuan; Ludwig, Lewis D. *Nagata-Smirnov revisited: spaces with  $\sigma$ -WHCP bases*. Topology Proc. **29** (2005), no. 2, 559-565.
- Liu, Chuan; Ludwig, Lewis D.  *$\kappa$ -Frchet Urysohn spaces*. Houston J. Math. **31** (2005), no. 2, 391-401.
- Burke, Dennis K.; Ludwig, Lewis D., *Hereditarily  $\alpha$ -normal spaces and infinite products*, Topology Proc. **25**, (2000), Summer, 291-299.
- Ludwig, Lewis D.; Szeptycki, Paul J. *A consistent example of a  $\beta$ -normal, non-normal space*. Topology Proc. **25** (2000), Spring, 251-254.
- Arhangel'skii, A. V.; Ludwig, Lewis D., *On  $\alpha$ -normal and  $\beta$ -normal spaces*. Comment. Math. Univ. Carolin. **42** (2001), no. 3, 507-519.

**Research Publications Under Review**

- Arbisi, Pamela; Ludwig, Lewis D., *Linking in Straight-edge embeddings of  $K_7$* , submitted May, 2007 to the Journal of Knot Theory and Its Ramifications.
- Ludwig, Lewis D.; Nyikos, Peter; John E. Porter, *Dowker Spaces Revisited*, submitted March, 2008 to Topology Proceedings.

### Other Publications

- Havill, Jessen; Ludwig, Lewis D., *Technically speaking: Fostering the communication skills of computer science and mathematics students*, Proceedings of the Thirty-Eighth SIGCSE technical symposium on computer science education, 185–189, 2007.
- Ludwig, Lewis D., *On the path to scholarship*, Proceedings of the Conference on Promoting Undergraduate Research in Mathematics, American Mathematical Society, Providence, RI, 2006.
- Ludwig, Lewis D., *Instructor Resources for Why knot?*, Key Curriculum Press, web-based materials, June, 2006.
- Adams, Colin; Ludwig, Lewis D., *Math Talk*, Mathematical Intelligencer **27** (2005), no. 3, 31–32. (submitted August 2004)
- Howard, Keith; Ludwig, Lewis D., *Hands-on learning in calculus via Maplelets-based projects*, The Proceedings of the Sixteenth Annual International Conference on Technology in Collegiate Mathematics, 2003. (submitted October, 2003)

### Student Publications

- Hughes, Colleen, *Linked triangles in straight edge embeddings of  $K_6$* , Pi Mu Epsilon Journal, **12** (2006), no. 4, 213–218. Winner of The 2006 Richard V. Andree Award for best student article published in 2006. (submitted October, 2005)

### Invited Research Talks

- *Links and knots in straight-edge embeddings*, 2008 Research Experience for Undergraduates Program Colloquium, SUNY-Potsdam, June, 2008.
- *Links and stick knots revisited*, 2007 Math Colloquium, Manhattan College, November, 2007.
- *Links and stick knots*, 2007 Research Experience for Undergraduates Program Colloquium, James Madison University, June, 2007.
- *Linking in straight-edge embeddings of  $K_7$* , New York City Colleges Topology Seminar, College of Staten Island, December, 2006.
- *Knot theory*, Five Colleges Speaker Circuit, Kenyon College, October, 2006.
- *Untangling Knot Theory*, FASt Talk Colloquium, Denison University, September, 2006.
- *$\sigma$ -wHCP Spaces*, New York City Colleges Topology Seminar, University of Connecticut - Stamford, December, 2004.
- *Knot theory, graph theory, and their link* two-part presentation with Colleen Hughes ('06), 32nd Annual Fall Mathematics Conference at Miami University, October, 2004.
- *Nagata-Smirnov revisited: Spaces with  $\sigma$ -weakly hereditarily closure preserving bases*, 19th Summer Conference on Topology and Its Applications, University of Cape Town, South Africa, July, 2004.
- *Current Progress on  $\kappa$ -Fréchet Urysohn Spaces*, New York City Colleges Topology Seminar, College of Staten Island, December, 2003.
- *Hands-on Learning in Calculus via Maplelets-based Projects*, The Sixteenth Annual International Conference on Technology in Collegiate Mathematics, Chicago, IL, October, 2003.

- *Recent progress in the study of  $\kappa$ -Fréchet Urysohn Spaces*, 2003 Summer Conference on Topology and Its Applications, Howard University, July, 2003.
- *Recent progress in  $\alpha$ -type separation axioms and a new type of convergence*, Brooklyn Topology Conference, Brooklyn College, June, 2003.
- *A Katětov-type result via  $\beta$ -normality*, presented at the Nogura Topology Mini-Conference, Slippery Rock University, March, 2002.
- *Discovery Learning - The Modified Moore Method*, invited talk for the Ohio Project NExT, presented at the 2002 Spring MAA Ohio Section at Xavier University, April, 2002.

### Contributed Research Talks

- *Linking in straight-edge embeddings of complete graphs*, Graph Theory and Applications session, MathFest, San Jose, CA, August, 2007.
- *When graph theory meets knot theory*, Communicating Mathematics, University of Minnesota - Duluth, July, 2007.
- *Dowker spaces revisited*, 10th Prague topological symposium, Czech Republic, August, 2006.
- *Recent progress on  $\sigma$ -wHCP spaces*, 2005 Spring Topology and Dynamical Systems Conference, Berry College, GA, March, 2005.
- *On  $\kappa$ -Fréchet-Urysohn spaces*, presented at the 2002 Zoltan Balogh Memorial Conference at Miami University, 2002.
- *A strengthening of a result by A.H. Stone and its application to infinite products*, 2002 AMS/MAA National Meetings, San Diego, CA, 2002.
- *Applications of  $\alpha$ -normal and  $\beta$ -normal*, presented at the 15th Summer Conference on General Topology and Its Applications, Oxford, Ohio, July, 2000.
- *Results on  $\alpha$ -normal and  $\beta$ -normal*, presented at the Spring General Topology and Dynamic Systems Conference, San Antonio, Texas, March 2000.

### Workshops Attended

- 2006 PCMI (Park City Math Institute) 3 week workshop on low dimensional topology organized by the Institute for Advanced Study with partial funding from the NSF held in Park City, UT.
- 2004 Ohio PREP (PROfessional Enhancement Program) workshop on knot theory at Ohio Northern University with partial funding from the NSF, 3 day workshop.
- 2003 National PREP (PROfessional Enhancement Program) workshop on knot theory at Wake Forest University with partial funding from the NSF, 5 day workshop.

### Pedagogical Talks

- *Technically speaking...*, poster presentation, Inventions and Impact 2: Building Excellence in Undergraduate Science, Technology, Engineering, and Mathematics (STEM) Education, a conference of Course, Curriculum, and Laboratory Improvement (CCLI) Program National Science Foundation, Division of Undergraduate Education, Washington D.C, 2008.
- *Report on technically speaking CCLI project*, NSF CCLI poster session, Joint Mathematics Meetings, San Diego, CA, January 2008.

- *Technically speaking: fostering the communication skills of CS and Math students*, 2007 Fall Ohio MAA Section Meeting, Wittenberg University, October, 2007.
  - *Fostering the communication skills of mathematics students*, 2007 MathFest, San Jose, CA, August 2007.
  - *Untangling Knot Theory*, FASt Talk Colloquim, Denison University, September, 2006.
  - *Evolution of Math 210*, Denison Scientific Association, February, 2006.
  - *Summer research at Denison*, invited talk for the Ohio Project NExT session, University of Miami, April, 2005.
  - *Speaking of Mathematics*, 80-minute special MAA panel co-organized with John Jacobsen of Harvey Mudd College, with speaker Joseph A. Gallian of the University of Minnesota - Duluth at the AMS/MAA National Meetings, Atlanta, GA, January, 2005.
  - *Entering the community of scholars: Summer research at Denison University*, special session on Initiating and Sustaining Undergraduate Research Projects and Programs, AMS/MAA National Meetings, Atlanta, GA, January, 2005.
  - *Complete Graphs – Finding the Link*, Five Colleges Speaker Circuit, College of Wooster, December, 2004.
  - *Why not? An introduction to knot theory and its applications to biology and chemistry*, Chowder Hour, September, 2004.
  - *When topology meets chemistry*, Denison Scientific Association, April, 2004.
  - *Check digits and error correction*, Special Session on Mathematical Applications in Computer Science, AMS/MAA National Meetings, Phoenix, January, 2004.
  - *Computer Visualizations for Calculus*, AMS/MAA National Meetings, Phoenix, January, 2004.
  - *How big is infinity?*, Faculty Lunch Series, Denison University, September, 2003.
  - *Why should I give a doughnut about point-set topology?*, presented at Oberlin College, March 2003.
  - *Understanding the fundamental theorem of calculus through writing*, presented at the 2003 AMS/MAA National Meetings, January, 2003, Baltimore, MD.
  - *Hands-on learning in calculus via computer-based projects*, presented at the 2002 Fall MAA Ohio Section, October, 2002, Kent State University – Trumbull.
  - *A Real World Application of the Area Under the Curve*, presented at the MAA MathFest 2002, August, 2002, Burlington, VT.
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- *Identification Numbers, Check Digits, and Error Correction*, presented at the 2002 Spring MAA Ohio Section at Xavier University.
  - *Applications of graphing calculators in the high school curriculum*, teacher in-service Talks program, Waverly High School, 2000
  - *Pros and cons of Harvard calculus reform*, Teaching Seminar, Ohio University, 1996

- *Using graphing calculators in the classroom*, teacher in-service program, North College Hill City Schools, June 1996

### Grants

- 2007 *National Science Foundation: Course, Curriculum, and Laboratory Improvement Grant*, \$72,746 for the project *Technically Speaking* to develop a series of instructional video vignettes which will be freely available on the web. This project is rooted in the experiences of the oral communication component of the Math 210 Introduction to Proofs course at Denison.
- 2007 *Mellon Cluster Award: Inter-Institutional Initiatives*, \$45,000 with colleagues from Furman University, Harvey Mudd College, and Vassar College to host the *The Art and Science of Teaching Mathematics*. A three day conference held at Harvey Mudd with over 30 participants from the cluster schools.
- 2006 *Mellon Faculty Career Enhancement Program*, \$3,378 for travel and housing to work with Colin Adams at Williams College for the month of January during junior leave.
- *National Science Foundation*, \$13,825 award with Joan Krone to host the “20th Summer Conference on Topology and Its Applications” at Denison University in July, 2005.
- 2004 *Mellon Faculty Career Enhancement Program*, \$5,000 award with Joan Krone to participate in the Midland Graduate School Spring Applied Semantics II Workshop in Nottingham, England.
- 2003 *Hands-on Learning in Calculus via Web-based Applets*, funded by the Collaboration with Technology Grant funded by the Mellon Foundation, \$8,000. Co-PI with Keith Howard of Kenyon College. Employed a student worker from Kenyon College and one from Denison University. Expanded on previous Mellon work and developed Maplets for the web.
- 2002 *Hands-on Learning in Calculus via Computer-based Projects*, funded by the Collaboration with Technology Grant from the Mellon Foundation, \$15,000. Collaborative effort with Judy Holdener and Keith Howard of Kenyon College and Zaven Karian of Denison University to develop hands-on Maple labs for the calculus sequence.

### Teaching

Precalculus	Elementary Topics for Math Education
Calculus I, II, III	Art of Mathematical Thinking
Probability and Statistics	(Honors and First Year Study)
Computer Science I (C++)	Probability and Statistics for Math Education
Introduction to Proofs	Discrete Mathematics
Real Analysis	Linear Algebra and Differential Equations
Advanced Mathematical Topics: Knot Theory	

### Teaching Awards

- ExxonMobil Project NEXt Fellow 2001
- University College Graduate Associate Outstanding Teaching Award 2000, Ohio University
- Outstanding Teaching Assistant, Ohio University 1998
- Outstanding Teaching Assistant, Miami University 1996

### Service to the mathematical community

- *Reviewer*, NSF CCLI proposals, 2008.
- *Guest editor* for *Topology Proceedings* **30** (2006), no. 2 which contains 16 refereed research articles from 3 major categories on general Topology.
- *20<sup>th</sup> Summer Conference on Topology and Its Applications* July 10-13, 2005 and the *Special Workshop on Computational Topology* lead organizer and host. An 5-day international conference with over 170 participants and 115 scholarly presentations from five distinct areas of General Topology: Topology and Set Theory, Topological Groups and Semigroups, Topology in Functional Analysis, Topology in Computer Science, Topology in Dynamical Systems, and Computational Topology.
- *Denison Topology Conference* organized and hosted, February 21-22, 2003. Eighteen individuals from ten institutions attended. The keynote speaker, A.V. Arhangel'skii of Ohio University, gave a two-part seminar on "Around Lindelöf Property." Other invited speakers included Dennis Burke of Miami University, Todd Eisworth of the University of Northern Iowa, and Paul Gartside of the University of Pittsburgh. Five contributed talks were given.
- Referee *Topology and Its Applications*, 2004, 2005, 2008.
- Review manuscripts for Key College Publishing, 2004.
- Review manuscripts for the MAA Classroom Resource Materials, 2003, 2004, 2005.
- Refereed one research article for the *Topology Proceedings*, 2003.
- Referee *JOMA*, 2003, 2006, 2007.
- Reviewed one manuscript for Wiley Publishing, 2003.
- Invited judge for Undergraduate Research Poster Session, AMS/MAA National Meetings, 2002, 2003, 2004.
- Mathematical Association of America Liaison for Department of Mathematics and Computer Science at Denison University.
- *The Moore Method*, organizer and facilitator of panel discussion, Project NExT, MathFest, Burlington, VT, August 2002.

### Service to department and student activities

- Faculty advisor for summer Anderson Scholar Sam Behrend '09, summer 2008. Sam presented our findings at the national 2008 MathFest meeting in Madison, WI and was 1 of 8 students to win an award (\$150) for best presentation and result from 48 presentations at the Pi Mu Epsilon student session.
- Faculty advisor for summer Anderson Scholar Rachel Grotheer '08, summer 2007. Rachel presented our findings at the national 2007 MathFest meeting in San Jose and was 1 of 12 students to win an award (\$150) for best presentation and result from 75 presentations at the Pi Mu Epsilon student session. Rachel also was one of 34 students from 185 chosen for a similar award at the JMM Undergraduate Poster session.
- Faculty advisor for summer Anderson Scholar Pam Arbisi '07, summer 2006. Pam used this work for her honors thesis.
- Faculty advisor for summer Anderson Scholar Evan Starr, summer 2006.
- Faculty sponsor for 7 students who attended the 2007 Spring MAA Ohio Section, Shawnee State University, March 2007. Three of these students

gave 15 minute presentations in the student session and all competed in the student competition.

- Faculty sponsor for five students attending the Nebraska Conference for Undergraduate Women in Mathematics. Three of these students gave 15 minute presentations on their summer research.
- Advisor for the student-run Math Club, founded fall, 2004.
- Developed and organized biweekly FASt Talks series (Faculty And Student Talks), fall 2003- fall 2005.
- Developed, edited, and published bi-semester editions of the *Logical Times*, the newsletter for the department, 2003-2005.
- Faculty sponsor (with K. Hutson and J. Havill) for 19 students who attended the 32<sup>nd</sup> Fall Mathematics (2005) Conference at Miami University, Oxford. Three of these students gave 20 minute presentations at the  $\pi\mu\epsilon$  Student Session.
- Faculty sponsor (with K. Hutson and M. Neal) for eleven students attending the 2005 Spring MAA Ohio Section, Miami University, March 2005. Nine of these students gave 15 minute presentations in the student session.
- Faculty sponsor (with T. Feil, K. Hutson, and M. Neal) for 21 students attending the 32<sup>nd</sup> Fall Mathematics (2004) Conference at Miami University, Oxford. Three of these students gave 20 minute presentations at the  $\pi\mu\epsilon$  Student Session.
- Faculty advisor for summer scholar Colleen Hughes '06, summer 2004. Colleen used this work for her honors thesis. She presented this work at two national conferences, the 2004 MathFest in Providence and the 2005 Joint Mathematical Meetings in Atlanta winning an award for quality of presentation and result at each (\$150 and \$100 respectively). Colleen published this work in the Journal of Pi Mu Epsilon in 2006 and won the 2006 Richard V. Andree Award for best student article published in 2006 (\$ 300).
- Organized and hosted speaker Ralph Kopperman of City College of New York, *Digital topology*, 2003.
- Faculty sponsor (with M. Neal) for eleven students attending the 2004 Spring MAA Ohio Section, University of Cincinnati, March, 2004. Eight of these students gave 15 minute presentations in the student session.
- Faculty sponsor for presentations by Elizabeth Ehret '04 and Anthony Fressola '04 at the Special Session on Undergraduate Research at the 2004 AMS/MAA National Meetings, Phoenix, AZ, January, 2004.
- Faculty sponsor (with K. Hutson and M. Neal) for 15 who attended the 31<sup>st</sup> Fall Mathematics Conference (2003) at Miami University, Oxford. 2 of these students gave 20 minute presentations at the  $\pi\mu\epsilon$  Student Session.
- Faculty sponsor (with M. Neal) for 15 students who attended the 2003 Spring MAA Ohio Section, Ohio State University, April, 2003. Faculty sponsor for student presentation, *Topological Logics*, by Anthony Fressola.
- Co-author of Mathematics Proficiency Test (with M. Neal) used since June 2003 Orientation for incoming students.
- Faculty sponsor for poster presentation by Anthony Fressola '04 and Stoyan Paunov '04, Undergraduate Student Poster Session at the 2003 AMS/MAA National Meetings, Baltimore, MD, January, 2003.

## Service to Denison

- Table leader for 2007 Fall Faculty Conference with Barbara Tewksbury.
- Member of 2007 Howard Hughes Medical Foundation grant committee.
- Elected by the members of the Council for Undergraduate Research (CUR) for a three year term as a CUR Councilor representing the Math and Computer Science Division, 2007. Attended annual business meeting in June, 2007 at Hamilton College.
- Presentation *Technically Speaking* for alumnus Skip N. Hansford per the request of Jon Bridge and Scott Siddall, April, 2007.
- Organized and hosted Convocation Speaker George Hart of Stony Brooke University, *Geometric Sculptures*, April, 2007.
- Entrepreneurial Stipend Selection Committee, Career Services, 2004-2007.
- Invited faculty speaker for 2005, 2007 Paving the Way Pre-Orientation.
- Member of University Council, fall, 2005.
- Finance Committee, member fall 2004-spring 2006, chair fall 2006-spring 2007.
- Organized and hosted national speaker Joseph A. Gallian of University of Minnesota - Duluth, *How to present your research*, 2003, especially geared for the science faculty.
- Designed pilot course in the Mathematics Department that fulfilled the GE oral communication requirement with T. Feil, 2004.
- Adapted the course The Art of Mathematical Thinking for the First Year Study program and offered two sections in the spring of 2004.
- June Orientation Advisor, 2003–2007, August Orientation Advisor, 2004, 2007.
- New Faculty Orientation invited speaker, 2004.
- Select Scholars Overnight Program, faculty focus speaker, 2004, 2006.
- Developed and offered a new honors course, The Art of Mathematical Thinking, 2003.
- Organized and hosted Convocation Speaker Edward Burger of Williams College, *Magic with Mathematics: Is the Formula Quicker than the Eye?*, February 2003.
- Science Open House, workshop speaker, 2002.

## Employment

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|---|----------------------------|
| • <b>Denison University</b>                   | Granville, Ohio            |
| Assistant Professor                           | September 2002 – present   |
| • <b>Kenyon College</b>                       | Gambier, Ohio              |
| Visiting Assistant Professor                  | August 2001 – May 2002     |
| • <b>Miami University</b>                     | Oxford, Ohio               |
| Visiting Professor                            | August 2000 – May 2001     |
| • <b>Ohio University</b>                      | Athens, Ohio               |
| Graduate Teaching Fellow                      | September 1996 – July 2000 |
| Mathematics Library Coordinator               | September 1998 – July 2000 |
| • <b>Project SUSTAIN</b>                      | Athens, Ohio               |
| Administrative Assistant/Advisory Team Member | June 1999 – July 2000      |
| • <b>North College Hill High School</b>       | Cincinnati, Ohio           |
| Mathematics Teacher                           | August 1995 – June 1996    |

- **Miami University**  
Graduate Teaching Assistant  
Oxford, Ohio  
August 1993 – May 1995
- **College of Mount St. Joseph**  
Adjunct Instructor, Mathematics Department  
Cincinnati, Ohio  
May – August 1996  
Adjunct Instructor, Business Department  
January – May 1993  
Director of Peer Tutoring  
May 1991 – June 1992