

JONATHAN K. SIMON

Short CV (Selected activities)

January 2007

PART 0. GENERAL INFORMATION

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0.1 EDUCATION:

Ph.D.	University of Wisconsin (Madison)	1969
MA	University of Wisconsin (Madison)	1965
AB	Columbia College (New York)	1964

0.2 EMPLOYMENT:

<u>University of Iowa</u>	Professor, Mathematics	1980 - present
	Proj. Dir. NSF VIGRE Grant	Fall 2006 - continuing
	Chair, Computer Science Department	1990-93
	Assoc. Chair, Mathematics	Undergraduate Prog., 1996 - 2000 Graduate Prog. 1989-90,
	Associate Professor	1974 - 80
	Assistant Professor	1969 - 74

Part 1. TEACHING

I greatly enjoy, and am proud of, my teaching. I have taught a wide range of undergraduate and graduate courses, ranging from remedial courses and large introductory lectures to advanced undergraduate and graduate courses, to Ph.D. supervision

1.1 COURSES IN RECENT SEMESTERS

Regular Courses	22M:10 Finite Mathematics 22M:16 Calculus for Biol. Sci., 22M:026 Calculus II 22M:28 Calculus III 22M:040 Matrix Algebra for Engineers 22M:042 Vector Calculus for Engineers 22M:130 Elementary Topology 22M:132 General Topology 22M:201 Algebraic Topology, 22M:305 Topics in Topology
Seminars/Readings	22M:392 Seminar in Topology 22M:199 Readings in Mathematics 22M:399 Reading and Research

1.5 PH.D STUDENTS

Dec 05 Ph.D.	Jenelle McAtee	"Knots of constant curvature" (also paper published)
prior	Eric Rawdon, Aaron Trautwein, Pei-Yi Zhao, K. Wolcott, C.M. Tsau, W. Ortmeyer, W. Clarke	

Part 2. RESEARCH

2.1 PUBLICATIONS: (SINCE 1996)

(note: Papers with multiple authors are "approximately equal contributions from all authors" unless principal author is indicated by *. . All papers are refereed unless otherwise noted.)

- "Unified theory of filament entangling" (with G. Buck*), ongoing revisions of draft
- " Möbius transformations of polygons and partitions of 3-space" (JS* with R. Randell* and J. Tokle), presented at AMS meeting 5/99, improved AMS 4/01 and Seminar Fall 04. (Preprint posted 2/06 ArXiv math.GT/0602466)
- "Physical knot theory" (with G. Buck and R. Scharein), (expository, not refereed), accepted 1/97 by *Scientific American*. (do not know if/when they will publish).
- 36 "Models of entanglement" (with G. Buck), accepted 11/06 for OCAMI Studies Vol I: Knot Theory for Scientific Objects (24 pgs.)
- 35 "Total curvature and packing of knots" (with G. Buck), Topology and its Applications 154 (2007), 192--204. (ArXiv math/0310365)
- 34 "Polygonal approximation and energy of smooth knots" (with E. Rawdon), Jour. Knot Theory and its Ramification, Jour. Knot Theory and its Ramifications 15 (2006), 429-451. (ArXiv math/0305414)
- 33 "Physical Knots", Contemporary Mathematics, 304 (2002), 1-30 (revised, expanded, and refereed version of #31).
- 32 "Möbius energy of thick knots" (with E. Rawdon), Topology and its Applications, 125 (2002), 97-109.
- 31 "Physical Knots", expository/lecture notes [27 pgs.] (not refereed), distributed in book of Lecture Notes by MAA for Jan. 01 Short Course in "Knots in Science", Jan. 2001.
- 30 "Thickness and crossing number of knots" (with G. Buck), Topology and its Applications, 91 (1999), 245-257.
- 29 "Thickness of knots", (with R. Litherland*, O. Durumeric, and E. Rawdon), Topology and its Applications, 91, (1999), p. 233-244.
- 28 "*Preface to* Energy functions for knots: beginning to predict physical behavior", (invited book chapter) update/exposition/new color figures and reprinting of article 25 below, in Ideal Knots (A. Stasiak, V. Katritch, L. Kauffman Eds.), World Scientific Pub., 1998.
- 27 "Energy and thickness of knots", Topology and Geometry in Polymer Science (ed. S. Whittington, D. Sumners, et al), IMA Volumes in Mathematics and its Applications #103, Springer-Verlag Publ., New York, 1998, 49-66.
- 26 "Energy and length of knots", (with G. Buck), Lectures at Knots96 (Ed. S. Suzuki), World Scientific Publ., 1997, 219-234.
- 25 "Energy functions for knots: beginning to predict physical behavior" (22 pgs.), in Mathematical Approaches to Biomolecular Structure and Dynamics (IMA Volumes in Mathematics and its Applications: Vol. 82), J.P. Mesirov, K. Schulten, and D.W. Sumners, Eds., Springer-Verlag Publ., New York, 1996.

2.2 SPECIAL RECOGNITION

In April '97, G. Buck and I were selected by the American Mathematical Society and the Joint Policy Board for Mathematics to present our joint NSF project in Washington DC as one of three mathematics projects (among 40 from various NSF areas) being presented to members of Congress and their staffs, to enhance understanding of NSF supported research. We developed a special video for this presentation.

2.3 GRANTS

Agency	Role of J.S.	Grant No. & \$\$	Dates	Title
NSF	Co-PI and Project Director	VIGRE grant DMS-0602242 (\$1.8M)	9/06 - 8/09	"Iowa Mathematics Initiative"
NSF	PI	DMS 01-07209 (\$ 177K tot)	2001- 2006	"Physical Knots"
NSF	PI	DMS 9706789 (\$129K tot)	1997-2000	"Physical Knot Theory"
NSF	P.I.	DMS 9407132 (\$67K + indir.)	1994-97	"Energy Functions for Knots"
NSF	Co- P.I.	DMS 88-03685	1988-89	(Computing Equipment)
ONR	PI	N00024-85-K-0099 (\$789,646 tot.)	1985-1988	"Stereochemical Topology":
NSF	P.I.	MCS 81-02145	1981-1984	(Topology)
NSF	P.I.	MCS 76-06992	1976-1980	(Topology)
NSF	P.I.	MPS 71-03065	1975	(Topology)
NSF	Faculty Associate	GP 29430	1972-1974	(Topology)
NSF	Faculty Associate	GP 19295	1970	(Topology)

2.4 TALKS (SINCE 1996)

- 10/06 "How can we measure tangling?", 20 min talk in AMS Special Session (co-organizer) on Physical Knotting and Linking, Cincinnati.
- 2/06 – Colloquium, conference hour talk, and other activities in residence for 3 wks, Osaka City University
3/06 Advanced Mathematics Institute
- 3/05 "Packing, curvature, and tangling of filaments, Colloquium Univ. Ala. Huntsville
- 3/05 "Packing, curvature, and tangling of filaments (III), invited 20 min talk in AMS Special Session on Knot Theory and its Applications, Bowling Green.
- 11/04 "Packing, curvature, and tangling of filaments", invited 20 min talk in AMS Special Session on Knots at Macromolecules, Pittsburgh
- 10/04 "Topology and Chemistry", 2 hour presentation to ACCA (an association of 12 colleges in the Chicago area) for chemistry students and faculty
- 3/04 "Total curvature and packing of knots", invited 20 min talk in AMS Special Session on Knot Theory at Applications, Tallahassee.
- 10/03 "Total curvature and packing of knots", invited 20 min. talk in AMS Special Session on Knots, Links, and Embedded Graphs, UNC
- 10/02 "Algebra of Knots and Physical Knots", Colloquium, Duquesne Univ.
- 7/02 "Mobius energy of thick knots", 30 min. talk at International Workshop on Topology in Condensed Matter Physics, Max Planck Institute, Dresden, Germany
- 4/01 "Inverting polygonal knots through spheres", invited 20 min. talk in AMS Special Session on Physical Knotting and Unknotting, UNLV.
- 1/01 "Physical Knots", invited 75 min. talk, one of eight comprising MAA Short-Course *Knots in Science*, annual AMS/MAA meeting, New Orleans.
- 10/99 "Polygonal approximation and energy of smooth knots", invited 20 min. talk in AMS Special Session on knot theory and applications, UNC Charlotte.
- 10/99 "Moving knots with obstacles", invited 45 min. talk in Computational Biology Mini-Symposium, Univ. Texas, Dallas.
- 10/99 "Moving knots with obstacles" (with K. Hunt), invited 30 min. talk in AMS Special Session on DNA topology, Univ. Texas Austin
- 5/99 "Minimum energy polygonal knots", invited 20 min talk at AMS/SMM Special Session, Denton Texas
- 4/99 "Critical Shapes of knots", invited series of two hour talks (Father Case Lecture Series), St. Louis Univ.
- 3/99 "Critical shapes of knots", invited 20 min. talk in AMS Special Session on low-dimensional topology, Univ. Illinois Champaign-Urbana
- 11/98 "Critical shapes of knots", invited hour talk at Louisiana Topology Conf., LSU, Baton Rouge.
- 10/98 "Knots" - 60 min. presentation/workshop "Knots, Braids, and Tangles" (with G. Buck*, R. Scharein*) at Annual Conference of ASCT (Association of Science-Technology Centers, the national assoc. of science museums), Edmonton, Alberta.
- 8/98 "Critical shapes of polygonal knots", Invited 50 min. talk and invited co-organizer of day session on Physical Knots at International Conf. on Knots, Delphi, Greece.
- 4/97 "Energy, thickness, and compaction of knots", invited 40 min. talk at DIMACS Workshop on DNA Topology, Rutgers Univ.
- 3/97 "Thickness and energy of knots", one-hour talk at MSRI Workshop on Computational and Algorithmic Methods in Three-Dimensional Topology, Berkeley.
- 7/96 "Length and energy of knots", Invited plenary talk in international conference on Knot Theory, Tokyo.
- 5/96 "Energy and thickness of knots", Invited plenary talk in IMA workshop on Polymers, Minneapolis.

3.1 SELECTED DEPARTMENT SERVICE: (SINCE 1999)

Many semesters	Faculty mentor, student advisor/mentor, promotion reviews, peer reviews, faculty search committees
Fall 06 - continuing	VIGRE Project Director
Fall 04 – Spr 07	Graduate Committee
Summer 04	Research mentor for minority undergrad/grad students
Fall 04 - continuing	Responsible for leading Heartland Mathematics Partnership activities (subseq. part of VIGRE project)
Fall 02 - Spr 05	Executive Committee
Fall 01 - Spr 04	Graduate Committee
Sept. 96 - Jun. 00	Associate Chair (Dir. Undergraduate Program)
Sept. 96 - Jun. 00	Undergraduate Committee (Chair)

3.2 SELECTED COLLEGE SERVICE (SINCE 1998)

03-04, 04-05	Search Committee in Mathematics Education (joint line)
Fall 01	Committee to select student Commencement speaker
1998-01	Faculty Assembly

3.3 SELECTED UNIVERSITY SERVICE (SINCE 1998)

Aug 05 – Jul 08	Faculty Judicial Commission
Fall 01 – Summer 05	Iowa Informatics Initiative Steering Committee
Fall 02, Fall 03	Carver Scientific Research Initiative Grants Review Committee
Fall 02, Fall 03 (+F 05 external)	Mathematical and Physical Sciences Grants Review Committee
Spr 00	Search comm. for Assoc. Provost for Undergraduate Education
1999-00	Honors Advisory Council
Sum 99 - Spr 00	Ad hoc committee on interdisciplinary majors
Spr. 98	Chair of search committee for Director of the Honors Program

3.4 SELECTED PROFESSIONAL SERVICE

annual	Review NSF grant applications in Topology and/or Applied Mathematics; referee journal articles (e.g. J. Knot Theory and its Ramifications, Topology and its Applications, Nature, Proc. N.A.S., conference proceedings).
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