Rob Schneiderman (Jan 2016)

Dept. Mathematics and Computer Science
Lehman College, City University of New York
250 Bedford Park Blvd Bronx NY 10468

Education:

- Ph.D., University of California, Berkeley, *Mathematics* 2001;
  Dissertation: *4-dimensional Intersection Numbers of Knots and Links in 3-manifolds*; Advisor: Robion Kirby.

- B. A. (Summa cum Laude), City University of New York, City College, *Mathematics* 1994.

Employment:

- Associate Professor, Department of Mathematics and Computer Science, Lehman College, City University of New York (September 2013-present);

- Assistant Professor, Department of Mathematics and Computer Science, Lehman College, City University of New York (September 2006-September 2013);

- Postdoctoral Lectureship, Department of Mathematics, University of Pennsylvania (July 2005 - July 2006);

- Courant Instructor/Assistant Professor, Courant Institute of Mathematical Sciences, New York University (September 2002 - July 2005);

- National Science Foundation Postdoctoral Fellow, (University of California, San Diego) and Visiting Postdoctoral Researcher at the Max Planck Institute for Mathematics, Bonn, Germany (July 2001-July 2002).

Research Interests:

Low-dimensional Topology: the geometry and topology of 3- and 4-dimensional manifolds, obstructions to embedding surfaces in 4-manifolds, invariants of knots and links in 3-manifolds.

Publications and preprints:

- *Geometric filtrations of string links and homology cylinders*, (with J Conant and P Teichner), to appear in Quantum Topology: https://www.ems-ph.org/journals/forthcoming.php?jrn=qt
  and arXiv:1202.2482 [math.GT]

- *Pulling apart 2-spheres in 4-manifolds*,
  (with P Teichner), Documenta Mathematica 19 (2014) 941–992. (http://www.math.uiuc.edu/documenta/vol-19/vol-19-eng.html)

- *Milnor invariants and twisted Whitney towers*,
  (with J Conant and P Teichner) J. Topology, Volume 7, Issue 1, (2013) 187–224.

- *Whitney tower concordance of classical links*,
  (with J Conant and P Teichner) Geom. Topol. (2012) 16 (2012) 1419–1479.

- *Tree homology and a conjecture of Levine*,
  (with J Conant and P Teichner) Geom. Topol. 16 (2012) 555–600.

- *Universal quadratic forms and Whitney tower intersection invariants*, (with J Conant and P Teichner) Geom. Topol. Monographs 18 (2012) 35–60.

- *Higher-order intersections in low-dimensional topology*,
  (with J Conant and P Teichner) Proc. Natl. Acad. Sci. USA vol. 108, no. 20, (2011) 8131–8138.

- *Stable concordance of knots in 3-manifolds*, Algebraic and Geometric Topology Vol 10 (2010).

- *Jacobi identities in low-dimensional topology*, (with J Conant and P Teichner) Compositio Mathematica 143 Part 3 (2007) 780–810.

- *Whitney towers and gropes in 4-manifolds*, Transactions of the American Mathematical Society 358 (2006).

- *Half-gropes, Simple Whitney towers and the Arf invariant of a knot*, Pacific Journal of Mathematics Vol 222, No 1, Nov 2005.

- *Whitney towers and the Kontsevich integral*, (with P. Teichner) Geometry andTopology monograph series Vol 7 (2004).

- *Algebraic linking numbers of knots in 3-manifolds*, Algebraic and Geometric Topology Vol. 3 (2003).

- *Higher order intersection numbers of 2-spheres in 4-manifolds*, (with P. Teichner) Algebraic and Geometric Topology, Vol 1 (2001).

Selected Recent Research Presentations:

- *Pulling apart 2-spheres in 4-manifolds*,
  Geometry and Topology Seminar,
  Graduate Center, City University of New York (February 2015).

- *Pulling apart 2-spheres in 4-manifolds*,
  Workshop on Algebraic Structures in Low-Dimensional Topology, Oberwolfach
  Mathematical Research Institute, Germany (May 2014) https://www.mfo.de/
  occasion/1422a

- *Intersection theory of Whitney towers*,
  Semester on 4-manifolds and their combinatorial invariants
  Max Planck Institute for Mathematics, Bonn Germany (May 2013). https://
  www.mpim-bonn.mpg.de/node/4688

- *Higher-order intersections in low-dimensional topology*, Special Session on
  Geometric and Algebraic Topology
  AMS 2011 Fall Eastern Sectional Meeting
  Cornell University (September 2011).
  http://www.albany.edu/ mv312143/11-9-AMS/

- *Higher-order intersections in low-dimensional topology*,
  Invited speaker at Low-dimensional manifolds and high-dimensional categories,
  Conference in honor of Michael Freedman
  UC Berkeley (June 2011)
  https://math.berkeley.edu/ ianagol/MF60/speakers.html

- *Whitney towers in low-dimensional topology*,
  Topology Seminar,
  Max Planck Institute for Mathematics, Bonn Germany (December 2010).

- *Geometric filtrations of link concordance*, Geometric Topology Seminar,
  Columbia University (February 2010).

Selected Other Research Presentations:

- Special session on knot theory and related topics, Joint AMS-KMS meeting, Seoul (December 2009),

- Special session on geometric topology, AMS sectional meeting, Wesleyan College (October 2008),

- 4-dimensional Manifolds Workshop at Oberwolfach Mathematics Institute, Germany (August 2006),

- Julius Shaneson's Ides of March Topology Festival: Submanifolds, Singular Varieties and Stratified Spaces, Courant Institute (2005),

- BANF International Research Station conference on Knots and their manifold stories (May 2003),

- Uni-Muenster, Junge Topologen und Neue Topologie conference (2001).

- AMS meetings (special session talks): Lyon, special session on Low-dimensional Topology; University of Nevada, Las Vegas, special session on the Topology of links.

- Topology seminars: UPenn, CUNY Grad Center, Max-Planck-Institut-fur-Mathematik; University of Marseille; Uni-Muenchen; Courant Institute; UC San Diego; University of Indiana; Stanford University; UC Berkeley; Barnard College/ Columbia University.

Grants and Awards:

- PI for Simons Foundation Collaborative Grant for Mathematicians 208938, (2011-2016);

- PI for NSF S-STEM grant: Lehman College Computer Science and Mathematics Mentorship and Scholarship Program 1060598 (2011-2014), with REU supplement (2014);

- Invited Visiting Researcher, Max-Planck Institute for Mathematics Bonn (summer/ fall 2010, summer 2012, May-June 2013, fall 2014, summer 2015);

- PSC-CUNY Research awards (2007, 2008, 2009);

- National Science Foundation Mathematical Sciences Postdoctoral Research Fellowship (2001); Visiting Postdoctoral Research Fellowship Max-Planck Institute Bonn (2001).

- Graduate Student Research Assistantships at UC Berkeley (spring 2000, spring 1998, fall 1998) and UC San Diego (summer 2000);

- Chosen to receive Math Department Fellowship, UC Berkeley (spring 1998);

- Graduate Student Instructorships, UC Berkeley, (fall 1994-spring 2001);

- Summer Research Fellowship, UC Berkeley (summer 1995);

- Emil Post Award CCNY (1994);

- Schwarz Scholarship CCNY (1992);

- Belden Mathematical Prize CCNY (1991);

- National Endowment for the Arts Jazz Performance Fellowship (1987).

Selected Mathematical Activities:

- Co-organized with Lou Kauffman, Vassily Manturov, and Kent Orr a workshop: "Algebraic structures in low-dimensional topology" at the Oberwolfach Mathematical Research Institute (May 25-31 2014). (http://www.mfo.de/occasion/1422a/www_view)

- Public Presentation on "Mathematical research and musical improvisation" at Max-Planck-Institute for Mathematics (Oct 2014). (https://www.mpim-bonn.mpg.de/node/ 5550)

- Supervised REU in Graph Theory and Introductory Topology for Lehman College student (summer 2014), and coordinated three other faculty supervising STEM REUs at Lehman (spring-summer 2014).

- Essay "Can one hear the sound of a Theorem?" published in *Best Writing on Mathematics 2012* (Princeton University Press). (http://philmat.oxfordjournals.org/content/early/2013/08/22/philmat.nkt027.extract)

- Designed, developed, and taught Foundations of Mathematics course for secondary school teachers, originally as participating faculty in Lehman College's NSF-funded Mathematics Teacher Transformation Institute (NSF Grant: MSP 0832247), now for undergrad and MA-level Mathematics majors.

- Performer in a Mathematischer Salon public presentation on the philosophy of mathematics and music at the Hausdorff Institute for Mathematics (October 2010). https://www.him.uni-bonn.de/uploads/media/Programmheft_2010_10_14.pdf

- Research mentor for graduate student in LSAMP "Bridge to the doctorate" program at Lehman College (2013).

- Co-organized with Elisenda Grigsby, Peter Teichner and Kevin Walker a workshop in Low-dimensional Topology at Mathematical Sciences Research Institute (2008). (https://www.msri.org/workshops/441)

- Co-organized special session in Low-dimensional Topology at regional AMS meeting, Courant Institute NYU (2003);

Service:

- Departmental graduate/undergraduate student advisor/mentor at Lehman College;

- Served on many departmental and college committees at Lehman College;

- Calculus committee at Lehman College (served as chair/coordinator);

- Departmental honors committee (Lehman College);

- Anonymous referee for various mathematics journals;

- Served as mentor for incoming graduate students and helped organize graduate student topology seminar at UC Berkeley.

Teaching Experiences:

Instructor at Lehman College CUNY:

- Topology (Grad and undergrad),

- Analysis (MAT 320),

- Foundations of Mathematics (MAT 670), Secondary mathematics from an advanced standpoint (MAT601)

- Calculus I, II, and III, (MAT 175, MAT 176, MAT 226) and labs (MAT155, MAT156), and Business Calculus (MAT 174),

- Linear Algebra (MAT 313), and Abstract Algebra (MAT 314),

- Precalculus (MAT 172), and Business precalc (MAT 171),

- Music and Mathematics (Honors seminar).

Instructor at UPenn:

- Low-dimensional Topology (grad course), Calculus II, Calculus IV, Linear Algebra.

Instructor at NYU:

- Topology (grad course), Advanced Calculus, Business Calculus, Calculus, Elementary Statistics, Logic.

Instructor at UC Berkeley:

- Multi-variable Calculus (two summers).

Instructor at City College CUNY:

- Pre-calculus (two summers).

Co-instructor at UC Berkeley:

- Developed and co-taught an experimental Introduction to Topology Course.

Teaching Assistant at UC Berkeley:

- Calculus, Discrete Math, Linear Algebra, Differential Equations.

Additional personal info:

I came to discover Mathematics after a career playing jazz piano which

included recording and performing throughout North America, Europe and Japan.

I've found that Mathematics demands the same blend of discipline and creativity

as playing improvised music at a high level. I enjoy describing Mathematics to

the Arts community as "music that only musicians can hear".