

# Tim Halpin-Healy

## Biographical Sketch

**Address:** Physics Department, Barnard College, Columbia University  
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<http://www.phys.barnard.edu/~healy/>

**Education:** Harvard University (9/82-8/87) Ph.D., Physics.  
Thesis: *Domain Wall Phases and Asymptotic Critical Wetting*  
(Advisors: Bert Halperin, Mehran Kardar, Edouard Brézin)  
Oral Exam Topic: “Critical Wetting in Binary Fluid Mixtures”  
Course Work: statistical mechanics, critical phenomena, phase transitions,  
field theory, renormalization group, solid-state, and astrophysics.

École Normale Supérieure, Paris (9/86-6/87) Predoctoral Fellow,  
Bourse Chateaubriand, French Government Scholarship.

Princeton University (9/77-6/81) A.B. *cum laude*, Physics.  
*Kusaka Memorial Prize: Excellence & Promise in Independent Research.*  
Senior Thesis Project:  
*Are Glueballs Found?*- a strong coupling expansion & Monte Carlo  
calculation of the glueball mass in SU(2) lattice gauge theory.  
Advisor: David Gross  
Junior Theses:  
i) *The Road to an Exotic World*- a study of the group theoretical methods  
employed in QCD. Advisor: David Gross  
ii) *The Discovery of Quantized Vortex Rings*- an analysis of elementary  
excitations in superfluid helium. Advisor: Keith DeConde

**Work:** Ann Whitney Olin Professor of Physics, Barnard College (2004-9)  
Full (1998), Assoc. (1994), Asst. (1989) Professor- Barnard, Columbia.  
*Independent College Fund of New York Teaching Award* (1995).  
ITP Postdoctoral Fellow- Physics Department, University of Maryland-  
College Park (9/87-8/89).  
Enseignant d'Informatique- Dept. de Physique, École Normale Supérieure,  
Paris (Spring '87) supervised advanced undergraduate students in  
research level computational physics projects.  
Harvard University Teaching Fellow- Phys 295 (grad SM), 232, 12, 1.  
Harvard Summer School Section Leader- Physics S1 (summers '83-85,87)  
*Certificate of Distinction in Teaching:* awarded by Harvard-Danforth  
Center for excellence in pedagogy & contributions to  
undergraduate education.  
Harvard High Energy Physics Lab- Proton Decay Expt (summer '82).  
Brookhaven National Lab: Solid State Theory Group (summers '80, '81).

# Tim Halpin-Healy

## Research & Scholarship

### I. Publications

[refereed journals]

Papers, prior to Barnard:

1. *Krypton on Graphite and the Striped Helical Potts Model*, THH & M. Kardar, Phys. Rev. B**31**,1664 (1985). [#Rapid Communication](#)
2. *Observation of Striped Phases in Adsorbed Helium Monolayers*, THH & M. Kardar, Phys. Rev. B**34**, 318 (1986).
3. *Low-Temperature Phases of Xenon on Graphite*, THH & M. Kardar, Phys. Rev. B**34**, 6557 (1986). [#Rapid Communication](#)
4. *Critical Wetting in Three Dimensions: A Ginzburg Criterion*, THH & E. Brézin, Phys. Rev. Lett. **58**, 1220 (1987).
5. *Scaling Functions for 3d Critical Wetting*, E. Brézin & THH, J. de Physique **48**, 757 (1987).
6. *Diverse Manifolds in Random Media*, THH, Phys. Rev. Lett. **62**, 442 (1989).
7. *Growth in a Restricted Solid-on-Solid Model*, THH, Phys. Rev. Lett. **63**, 917C (1989).
8. *Effective Exponents for Critical Wetting- Approach to the Asymptotic Region*, THH, Phys. Rev. B**40**, 772 (1989).

Barnard, pre-tenure:

1. *Disorder-Induced Roughening of Diverse Manifolds*, THH, Phys. Rev. A**42**, 711 (1990).
2. *2d Critical Wetting Revisited*, M. Zapotocky\* & THH, Physica A**177**, 453 (1991).
3. *Directed Polymers in Random Media: Probability Distributions*, THH, Phys. Rev. A**44**, 3415 (1991). [#Rapid Communication](#)
4. *Depinning by Quenched Randomness*, M. Zapotocky\* & THH, Phys. Rev. Lett. **67**, 3463C (1991).
5. *Amplitude Universality for Driven Interfaces & DPRM*, J. Krug, P. Meakin, and THH, Phys. Rev. A**45**, 638 (1992).
6. *On the Kinetic Roughening of Vicinal Surfaces*, THH & A. Assdah,\* Phys. Rev. A**46**, 3527 (1992).
7. *Discerning Differences Among Anomalously Wandering Directed Polymers*, N.-N. Pang\* & THH, Phys. Rev. E**47**, 784 (1993). [#Rapid Communication](#)
8. *Disturbing the Random Energy Landscape*, THH & D. Herbert,\*\* Phys. Rev. E**48**, 1617 (1993). [#Rapid Communication](#)
9. *Directed Polymers w/ Columnar Disorder*, J. Krug & THH, J. Phys. I France **3**, 2179 (1993).
10. *Competing Effects of Point vs. Columnar Defects on the Roughening of Directed Polymers*, I. Arsenin,\* THH & J. Krug, Phys. Rev. E**49**, 3561 (1994). [#RC](#)

& following tenure considerations:

11. *Concise Calculation of the Edwards-Wilkinson Probability Functional*, Y.-K. Yu,\* N.-N. Pang,\* & THH, Phys. Rev. E**50**, 5111 (1994).
12. *Kinetic Roughening Phenomena, Stochastic Growth, Directed Polymers & all that*, THH & Y.-C. Zhang, Phys. Rep. **254**, 215-415 (1995). [>1150 citations](#)
13. *Interfacial Kinetic Roughening w/ Correlated Noise*, N.-N. Pang,\* Y.K. Yu\* & THH, Phys. Rev. E**52**, 3224 (1995).

14. *Chemical Wave Refraction Phenomena*, S.-C. Hwang\*\* & THH, Phys. Rev. **E54**, 3009 (1996).
  15. *DPRM Ground-State Energy Anisotropy*, J. Krug & THH, J.-Phys. A-Gen. Math. **31**, 5939 (1998).
  16. *Directed Polymers vs. Directed Percolation*, Phys. Rev. **E58**, 4096(1998). [#RC](#)
  17. *Tuning the Trip to KPZ Asymptopia*, THH & Rocky Novoseller,\*\* cond-mat/0004251
  18. *Dynamics of Multidimensional Secession: Fixed Points & Ideological Condensation*, A. Soulier\* & THH, Phys. Rev. Lett. **90**, 258103 (2003). Cover article, 27 June 2003.
  19. *Divergent Tendencies in Multidimensional Secession*, A. Soulier,\* N. Arkus,\*\* and THH, Braz. J. Phys. **33**, 611 (2003).
  20. *2+1 Directed Polymer in a Random Medium: Scaling Phenomena and Universal Distributions*, THH, Phys. Rev. Lett. **109**, 170602 (2012).
  21. *Extremal Paths, Stochastic Heat Equation & the 3d KPZ Universality Class*, THH, Phys. Rev. **E88**, 042118 (2013); **PRE88**, 069903E (2013).
  22. *Universal Aspects of Curved, Flat, and Stationary-State KPZ Statistics*, THH & Luna Lin\*\*, Phys. Rev. **E89**, 010103RC (2014); [#Editor's Suggestion & RC](#)
  23. *Universal Correlators & Distributions as Experimental Signatures of 2+1 KPZ Growth*, THH & G. Palasantzas, EPL **105**, 50001 (2014). [#Editor's Choice](#)
  24. *A KPZ Cocktail: Shaken, Not Stirred...*, THH & K. Takeuchi, J. Stat. Phys. **160**, 794 (2015). Earmarked, Science Citation Index: [#Highly-Cited Paper \[Top 1%, PHYS\]](#)
- \*CU grad student, \*\*Barnard College undergraduate coauthor

Total Citation Count: ~2250 (5/10/19, Web of Science- SCI).

## II. Grants

1. NSF DMR-0434500 (\$93K, 2004-09) Nonequilibrium Statistical Mechanics: Fragmentation, Dispersal & Coalescence; *research, undergraduate summer stipends*
2. NSF DMR-0083204 (\$78K, 2000-03) Extremal Paths in Complex Systems; *research, undergraduate summer stipends*
3. NSF CCLI (\$65K, w/ Les Lessinger, 2000-03) *materials science pedagogy*
4. ITP Scholar- UCSB, Theoretical Physics (\$7K, 1998-2000) *travel, research*
5. NATO Collaborative Research Grant (\$6K, 1997-98) *international research*
6. NSF DMR-9528071 (\$81K, 1995-1999) Diverse Manifolds in Random Media *research; undergraduate summer stipends*
7. NSF DMR-9211240 (\$54K, 1992-95) Roughened Manifolds in Ill-Condensed Matter *research, undergraduate summer stipends*
8. PRF-AC (\$40K, 1991-92) *research, graduate student support*
9. NSF UCCD (\$48K, 1991-92) The Early Universe: A Means of Securing the Pipeline *departmental mini-computing facility*
10. PRF-GB starter grant (\$18K, 1990-91) *research, undergraduate summer stipends*
11. PEW Charitable Trust (\$10K, 1991) *Numerical Recipes course*
12. Research Corporation (\$21K, 1989-92) *undergraduate research*

Plus, heavy involvement in Barnard College grants-

Luce Foundation- *CBL Scholars Program* (\$200K, 2016-18)

NSF DUE-9850035 (\$200K, 1998-2001) *Science Education for Tomorrow*

As contributor to multiple manifestations of the College's Hughes grant, whether it be summer research mentoring, teaching in Barnard-LaGuardia Intercollegiate Program, or organizing a *Mathematical Toolbox* course.

### III. Selected Colloquia, Seminars, Talks, etc...

- Feynman's Gold*, Statistical Mechanics Meeting, Rutgers University, 17 December 2018.
- Within & Beyond the Realm of KPZ*, Applied Math Seminar, Harvard University, Cambridge MA, 15 November 2018; too, UVA (4/26/18), Virginia Tech (4/27/18)
- Within & Beyond the Realm of KPZ*, Statistical Physics Seminar, ITP, Univ-Cologne, Germany, 18 January 2018.
- Within & Beyond the Realm of KPZ*, Collège de France, Paris, inaugural seminar, associated w/ Bernard Derrida's 2018 statistical physics course *Désordre, croissance et exclusion*, 15 January 2018.
- 2+1 KPZ: Universal Distributions, Correlators, and Ageing*, Abbaye des Premontres, Pont-a-Mousson, Metz-France; 2016 StatPhys satellite conference on *Non-Equilibrium Dynamics in Classical & Quantum Systems*, 15 July 2016.
- A KPZ Playbook*, KITP-Santa Barbara, opening lecture for the Spring 2016 KITP Program *New Approaches to Non-Equilibrium & Random Systems: KPZ Integrability, Universality, Applications & Experiments*, 12 January 2016.
- Universal Correlators & Distributions As Signatures of 2+1 KPZ Stochastic Growth*, Yukawa Institute for Theoretical Physics, Kyoto Japan, 22 August 2014.
- 25 Years of KPZ*, Rutgers Statistical Mechanics Meeting, 9 May 2011.
- The Dynamics of Conformity & Dissent*, Seminar- Center for Studies in Physics & Biology, Rockefeller University, 13 April 2010.
- The Dynamics of Conformity & Dissent*, Dynamics Days- Conference on Chaos & Nonlinear Dynamics, Boston, MA 4 January 2007.
- The Dynamics of Conformity & Dissent*, Séminaire- Département de Physique, Ecole Normale Supérieure, Paris, France, 17 March 2005.
- The Dynamics of Conformity & Dissent*, University of Pennsylvania, Physics Department, MRSEC Seminar, 11 March 2005.
- The Dynamics of Conformity & Dissent*, Collective Dynamics Group- Sociology Department, Columbia University, 4 Feb 2005.
- The Dynamics of Conformity & Dissent*, Brookhaven National Laboratory, Physics Colloquium, 4 January 2005.
- The Dynamics of Conformity & Dissent*, Columbia University, Physics Department Colloquium, 13 December 2004.
- The Dynamics of Conformity & Dissent*, University of Maryland-College Park, Physics Department Seminar, 11 November 2004.
- The Dynamics of Conformity & Dissent*, Service de Physique Théorique, CEA-Saclay, Gif-sur-Yvette (Paris), France, Theory Seminar, 22 June 2004.
- The Dynamics of Conformity & Dissent*, Physics Department Seminar, University of Amsterdam, Netherlands, 17 June 2004.
- Within the Realm of KPZ*, Instituut-Lorentz, University of Leiden, Netherlands, 14 June Collective Aspects of Stochastic Non-Equilibrium Phenomena at Surfaces & Interfaces; opening conference talk.
- The Dynamics of Conformity & Dissent*, Theory Seminar, Neils Bohr Institute, NORDITA, Copenhagen, Denmark, 9 June 2004.
- The Dynamics of Conformity & Dissent*, Applied Maths Seminar, Imperial College, London, UK, 2 June 2004.
- The Dynamics of Conformity & Dissent*, Complex Adaptive Systems Seminar, Oxford Said Business School, Oxford University, UK 1 June 2004.

*The Dynamics of Conformity & Dissent*, MEMOS Seminar, Sociology Department, University of Groningen, Netherlands, 19 May 2004.

*Within The Realm of KPZ*, Applied Physics Seminar, University of Groningen, Netherlands, 18 May 2004.

*The Dynamics of Conformity & Dissent*, Theoretisch-Physikalisches Kolloquium, Univ. of Cologne, Germany, 23 April 2004.

*The Dynamics of Conformity & Dissent*, Physics Department Colloquium, University of Utrecht, Netherlands, 14 April 2004.

*Nonequilibrium Statistical Mechanics: Consensus & Coarsening Phenomena*, Landelijk Seminarium Statistische Mechanica, Leiden, Netherlands, 20 February 2004.

*The Dynamics of Conformity & Dissent*, Condensed Matter Theory Seminar, Physics Department, Oxford University, 5 February 2004.

*The Dynamics of Conformity & Dissent*, Journées de Physique Statistique, l'Ecole Supérieure de Physique et Chimie (ESPCI), Paris, France, 30 January 2004.

*The Dynamics of Conformity & Dissent*, Instituut-Lorentz, University of Leiden, Netherlands, 8 January 2004.

*The Dynamics of Conformity & Dissent*, Rutgers Statistical Mechanics Winter Meeting, 15 December 2003.

*The Dynamics of Conformity & Dissent*, Massachusetts Institute of Technology, Chez Pierre- Condensed Matter Theory Seminar, 8 December 2003.

*The Dynamics of Conformity & Dissent*, Cold Spring Harbor Laboratory, Theoretical Neuroscience Division, Seminar, 29 October 2003.

*The Dynamics of Conformity & Dissent*, University of Capetown, South Africa, Physics Department Colloquium, 6 August 2003.

*Dynamics of Multidimensional Secession*, Physics Department, UFF- Rio Janeiro, Brasil 28 Feb 2003; conference talk.

Selection of prior invitations:

*Kinetic Roughening Phenomena*, Williams College, Physics Colloquium, 15 Sept 2000.

*Fractal River Basins & Deltas*, Isaac Newton Mathematical Institute, Cambridge University, UK, 22 March 1999.

*Kinetic Roughening, Stochastic Growth, Directed Polymers & all that*, Clarendon Laboratory, Physics Seminar, Oxford University, UK, 21 March 1999.

*Kinetic Roughening Phenomena*, University of Essen, Germany, 17 Dec 1997.

*A KPZ Primer I&II*, Isaac Newton Institute, Cambridge University UK, April 1994; 2 conference lectures. Six-month workshop visitor.

*Stochastic Growth & Directed Polymers*, Isaac Newton Institute for Mathematical Sciences, Cambridge University, UK; January 1994. Institute Colloquium.

*Kinetic Roughening Phenomena*, Institute for Advanced Study, Princeton, New Jersey; 5 May 1993.

*Directed Polymers in Random Media*, Physics Seminar, ATT Bell Laboratories, NJ, USA; Dec 1992.

*Statistical Mechanics of Roughened Manifolds*, Invited Lecture Series (4x3 hours); Troisième Cycle de Physique en Suisse Romande, Ecole Polytechnique Fédérale de Lausanne, Switzerland; 3-week stay, Oct/Nov 1992. Bound lecture notes.

*DPRM Probability Distributions*, Les Houches Ecole d'Hiver, *Surfaces Rugueuses*, Les Alps, France, 31 March 1992; invited conference lecture.

*Impurity-Stricken Magnets, Directed Polymers, Eden Clusters & all that*, Condensed Matter Theory Seminar, University of Chicago, IL; 28 April 1990.

*Finite Temperature Phase Transition- Directed Polymers*, Gordon Conference-Fractals, Plymouth, New Hampshire; 14 August 1990. Invited speaker.

# Tim Halpin-Healy: Pedagogy

## I. Coursework

New (i.e., Previously Non-Existent) Courses Put On The Books:

1. PHYS BC1205x- *The Early Universe*, 4.5 pts.\*
2. PHYS BC 1206x- *Mechanics*, 4.5pts. [renumbered as BC 2001x].
3. PHYS BC 1207y- *Electricity & Magnetism*, 4.5 pts. [2002y].
4. PHYS BC 1208x- *Waves*, 4.5 pts. [3001x, 5.0pts]
5. QUR BC1001x- *The Universe: An Astronomical Perspective*, 3.0 pts.\*
6. PHYS BC 3082x,y- *Advanced Physics Lab*, 1.5-3.0 pts.
7. PHYS BC 3086y- *Adv. Quantum Physics Lab*, 3.0 pts.
8. PHYS BC 3088x- *Adv. Electromagnetism Lab*, 3.0 pts.
9. SCPP BC 3334y- *Science & The State*, 4.0 pts.
10. PHYS G8036y- *Adv. Statistical Mechanics*, 3.0pts.
11. ICP BC 1202- *Chaos, Fractals & Dynamics*, 3.0pts.\*

(Barnard-LaGuardia Intercollegiate Summer Program)

12. STEM BC 2222- *Coding in the Sciences*, 4.0pts; w/ Brian Morton.

n.b., courses marked w/ an asterisk have come & gone, as appropriate to the needs of the college & shifts in departmental focus. As director of the BC *Science & Public Policy Program*, I have helped bring about SCPP BC 3333x- *Genetics, Biodiversity, and Society*, 3.0pts, team-taught by professors in the Biology, Economics, and Political Science Departments; also, provided midwifery services for SCPP BC 3335y- *Environmental Ethics, Leadership, and Action*, 4.0pts.

Other Courses Taught & In My Repertoire:

15. PHYS G6036x- *Graduate Statistical Mechanics*, 3.0 pts.
16. PHYS V3008x- *Electromagnetic Waves & Optics*, 3.0 pts.
- 17-18. PHYS V1201-2 *General Physics I,II* (Pre-med, algebra-based), 3.0 pts.
- 19-20. PHYS V1291-2 *General Physics I,II Lab* (Pre-med lab), 1.0 pt.
21. PHYS BC 1091x- *The Elementary Physics Laboratory I* (Poet's Lab), 1.0pt.
22. PHYS BC 1092y- *The Elementary Physics Laboratory II* (Poet's Lab), 1.0pt.
23. PHYS V3021y- *Quantum Physics*, 3.0 pts. [now PHYS BC 3006y]
24. CTSC BC1889y- *Working with Ideas*, 4.5pts.
25. CTSC BC3597/8- *Senior Presentation Seminar*, 1.0 pt.
26. PHYS G4023- *Statistical & Thermal Physics*, 3.0pts.
27. PHYS G4019- *Mathematical Methods of Physics*, 3.0pts.
28. PHYS G4003- *Advanced Mechanics*, 3.0pts.

In addition, I have taught in the Columbia University *Summer Program for High School Students* for many years:

- i) CUSHP SSI- *Investigations in Theoretical & Experimental Physics* (2001-present)
  - ii) CUSHP SSII- *Mathematical BootCamp for Budding String Theorists* (2009-present)
- as well as a stint in the CU *Science Honors Program* (for bright, scientifically curious 11<sup>th</sup> & 12<sup>th</sup> graders in the metropolitan area) on Saturday mornings during the academic year- <http://www.phys.barnard.edu/~healy/InMotion.jpg>

The CTSC courses above were associated with my responsibilities as co-Director of the Barnard College Centennial Scholars Program (Fall 2004-11), taught over the years w/ Elizabeth Castelli, Religion Department; also Helene Foley (Classics), Lisa Hollibaugh (1st Yr Dean), & Dorothy Denburg (Dean of College).

## II. Lab Development

Along with the brand new lecture components to the above courses, I have developed from “soup-to-nuts” a bunch of labs, a task which included designing, shopping, implementing, trouble-shooting, and drafting instructional laboratory handouts for each of the following experiments:

PHYS BC 1206x- *Mechanics*:

1. Kinematic Circus (MacMotion)
2. Viscous Drag & Galileo’s Parabolic Trajectories
3. Stress vs. Strain: Young’s Modulus
4. Energy & Momentum Conservation
5. Guilty or Innocent? Analysis of a Car Collision
6. Geometric Billiards
7. Bending & Buckling
8. Rotational Dynamics
9. Angular Momentum Conservation
10. The Wonderful World of Simple Harmonic Motion

PHYS BC 1207y- *Electricity & Magnetism*:

11. Ben Franklin Electrostatics
12. Millikan Oil-Drop Experiment
13. Electric Field Lines & Equipotentials: Silver Paint & Charcoal Paper
14. FieldPlots (Mac software)
15. e/m Experiment
16. Trochoidal Trajectories in Crossed E & B Fields
17. Oersted & Biot-Savart
18. DC Circuits I: Ohm’s Law- Voltage, Current, & Resistance
19. DC Circuits II: Capacitors, RC Decay, and Determining  $\epsilon_0$ .
20. Current Balance- Determination of  $\mu_0$ .
21. Faraday’s Law

PHYS BC 1208x- *Classical Waves*:

22. Diverse Pendula (hoops, rulers, & anharmonic Kater)
23. Mechanical Beats (coupled pendula)
24. Transverse Vibrations of Elastic Strings
25. Bending Modes in 1d Bars & 2d Chladni Plates
26. Wilberforce Pendulum: Coupling Translational & Vibrational Modes
27. Damped, Driven Mechanical Oscillator
28. Damped, Driven Electrical Oscillator & Fun w/ Lissajous Figures
29. Longitudinal Standing Waves in a Mini-Slinky
30. Organ Pipes: Standing Waves of Sound
31. Helmholtz Resonators (MacSound & Coke bottle pitch)
32. Auditory Demos: Fun Sounds (pitch salience, binaural beats, etc...)
33. Aural Combination Tones (nonlinear auditory phenomena)
34. Resonant Strings & Impedance Matching (computer lab, beaded string)
34. Torsional Wave Machine
35. Polarization Phenomena (Malus, Brewster, Haidinger, birifrigence, optical activity)
36. Reflection & Refraction (rainbows & caustics)
37. Water Waves I: Standing, Gravity Waves (nonlinear dispersion relation)
38. Water Waves II: Traveling Capillary Waves



39. Mirrors & Thin Lenses

40. Microwaves

PHYS BC3082x- *Numerical/Computer Experiments* (original formulation)

41. Feigenbaum's Number & The Period-Doubling Route to Chaos

42. Monte Carlo Simulation: Specific Heat of the 2d Ising Model

43. Brachistochrone: Testing Competing Trajectories

44. DLA & Eden Growth: Stochastic Aggregation Phenomena

PHYS BC 3086y- *Adv. Quantum Lab* (complements PHY V3021 lecture)

45. Hydrogenic Spectra: Balmer Series & Bohr-Sommerfeld Model

46. Determination of Planck's Constant: Photoelectric Effect

47. Franck-Hertz Experiment

48. Electron Diffraction

PHYS BC 3088x- *Adv. Electromagnetism Lab* (taken w/ PHY V3008 lecture)

49. Interferometry: Michelson, Fabry-Perot, & the Pressure-Dependent Refraction Index of Air

50. Fraunhofer Diffraction (& a glimpse of Fresnel)

51. Hertzian Waves I: Radio Receivers

52. Hertzian Waves II: Radio Transmitters

these 3000-levels are pretty beefy, and required plenty of work to develop; each of the labs runs 2-3 weeks and the students are given ample freedom to explore matters on their own. In addition, I organized labs for *The Early Universe* course (some of which found their way into Richard Friedberg's *Poets Lab*), as well as a healthy handful of numerical/computer labs for ICP BC 1202- *Chaos, Fractals, and Dynamics*. Unfortunately, there was no support staff available for the development of these calculus-based and advanced physics labs.

Finally, there are 3-4 experiments for the NSF Materials Science grant that I shared with Professor Les Lessinger in the Chemistry Department, exploring i) High-T<sub>c</sub> Superconductivity, ii) Resistivity of Noble Metals vs. Semiconductors, iii) Faraday Effect, and iv) STM=Scanning Tunneling Microscopy.

### III. NSF Equipment/Education Grants

1) sole PI: NSF UCCD#9150909- *The Early Universe*, which brought us, among other things, i) a mini-cluster of 6-8 Macs, Altschul 513, for use in our lab introductory sequence PHYS BC 1205-7 and ii) a small minicomputer facility of 3 Sun Sparcstations, in Altschul 509, for advanced undergraduate research & thesis projects.

2) co-PI: NSF CCLI#9952296- *New Lab Course in the Chemistry & Physics of Materials* mentioned immediately above; the big ticket item was an X-ray diffractometer, presently in use in the Chemistry Dept.

3) facilitator: NSF DUE#9850035- *Science Education for Tomorrow*, helped develop team-taught, science & public policy courses cutting across disciplines. SCPP BC 3333x- *Genetics, Biodiversity & Society*, and SCPP BC 3334y- *Science & The State*.

<http://www.phys.barnard.edu/~healy/3334c.gif>



## IV. Research Mentoring

Since Fall 1989, I have supervised student research projects as follows-

### i) BC Undergraduate Summer Research:

Devorah Herbert* BC'92	<i>CU MA in drama; playwright, producer</i>
Bonnie Tamminga% BC'93	<i>CU PhD Physics; FermiLab-distinguished, Lederman Post-Doctoral Fellow, Full Professor- Yale Physics Dept</i>
Yick Chan BC'93	<i>Harvard PhD Program- Physics</i>
Anna Seto BC'94	<i>NYU-Stern Business School</i>
Sheila David BC'95	<i>PhD program: geochemistry</i>
Rocio Patino BC'96	<i>MA: computer science; Hayden Planetarium</i>
Hasmik Diratzouian% BC'96	<i>Physician</i>
Deni Taveras BC'96	<i>MA program: environmental chemistry</i>
Michelle Baird BC'96	<i>social worker, practicing midwife</i>
Sin-Chun Hwang* BC'96	<i>Physician</i>
“Sam” McKinney BC'98	<i>University of Washington: Physics PhD Program</i>
Rocky Novoseller# BC'98	
Mary Pratt BC'01	<i>technical staff, Elsevier</i>
Natalie Arkus* BC'03	<i>Harvard PhD Program- Applied Mathematics</i>
Wing-Ki Wong BC'07	<i>CU 3-2 Program</i>
Whitney Becker BC'07	<i>Centennial Scholar</i>
Camille Avestruz BC'09	<i>Yale PhD Program- Physics</i>
Erin Sperry BC'11	
Yuexia Lin, BC'15	
Marte Saetra, VISP-Norway	<i>MA Program- Computational Physics (Oslo)</i>

### ii) CU Graduate Summer Research

Martin Zapotocky	<i>group leader, MPI-Complex Systems, Dresden</i>
Amine Assdah	<i>Rutgers PhD Program- Mathematical Physics</i>
Yi-Kuo Yu	<i>NIH scientist- Biophysics</i>
Igor Arsenin	<i>Wall Street</i>

### iii) PhD Students

Ning-Ning Pang CU PhD*96	<i>Associate Professor, NTU-Physics</i>
Arne Soulier CU PhD*03	<i>London Financial World, research analyst</i>
Aylin Cimenser CU PhD*04	<i>Postdoctoral Fellow, CU Neuroscience</i>

## V. Barnard College Service

### a. Programs

- i) Centennial Scholars (Fall 2004-2011), co-Director w/ Elizabeth Castelli (Religion)
- ii) Science & Public Policy (Fall 1999-present), pro-bono Director.
- iii) Clare Boothe Luce Scholars Program (Nov 2015-present), Grant PI & Director.

### b. Committees

- i) On Honors; Pre-Health (AY14-16), FACI (AY15-17); FBPC (AY96-05; 9 yr tour);
- ii) FGP (AY95-97; AY13-15)- Chair, revised elections, divisional trades, revamped Academic Code, grievances, new FAAC, Consensual Relationships, etc...
- iii) ACC (1994-97; 3 years)- one of the original apostles, long-term planning, short-term goals; unix email & a host of academic computing issues.
- iv) Facilities Development (1995-6, w/ Herb Sloan & Liz Boylan) bricks & mortar.
- v) Food Services AY94-95, vi) Security AY92-93, & vii) Grants AY90-91 Committees.

- viii) Altschul Renovation AY90-91 Committee.
- ix) Math Department Searches- Pacelli, Magnum, Walter Neumann, Thurston, Knight

### **c. Departmental**

- i) Design & Realization-Alt 514: Physics & Astronomy Common Room
- ii) Chair (Fall 2004-2007) although, in many respects, I shared these responsibilities with Richard Friedberg during my first 12 years at Barnard. Promotions to Full Professor- Laura Kay, Reshmi Mukherjee, Janna Levin.
- iii) Aside from my involvement in 27 courses (13 of them newly on the books...) and the development of >50 new experiments (soup-to-nuts, as they say), there's been plenty of good, old-fashioned elbow-grease expended, involving complete, gratis renovations on the fifth floor of Altschul, in which I gutted the rooms, bought the paint, wielded the brush, decorated, & stocked w/ equipment, salvaged Columbia blackboards, developed the labs & designed the experiments.

AY95-96: Altschul 510B- Advanced E&M/Quantum Physics Lab  
Site of PHYS BC 3086 & 3088 advanced labs.

AY96-97: Altschul 510C- Classical Waves Lab Room  
All PHYS BC3001 activities, lecture & lab, 5.0 pts, take place here.

AY90-91: Altschul 513- Introductory Physics Lab Room; Colleague paint job...  
[PHYS 2001-2 experiments are done in this large, central room]

AY89-90: Altschul 502- Physics Reading Room [photos, blackboard, screen]  
Altschul 5<sup>th</sup> Floor Hallways- 6 4x8 corkboards, 3 picture cases,  
2 huge blackboards, 5 astro posters, *Women Physicists* display,  
plants, etc.

- iv) Obtained grant funds to establish (AY91-92) Departmental *Mini-Computing Lab* in Alt 513 for use in the introductory physics sequence, as well as the Major/Minor's Workstation Facility in Alt 509 (AY94-96)- couches, SparcStations fully configured w/ Fortran & C compilers, EMACS, grtool, Netscape, etc.

## **V. Columbia University**

- i) Ad Hoc Tenure Committee
- ii) CU Graduate Courses:
  - PHYS G8036y- *Adv. Topics Statistical Mechanics*, 4.5pts. [Spring '95,97,99,01,03,16]
  - PHYS G6036x- *Statistical Physics*, 4.5pts. [Fall '93]
- iii) CU Graduate Students Advised: 3 Full, 4 Part-time.
- iv) CU Undergraduate Courses: PHYS V1201-2, 1291-2, 3021, 3008, 4019, 4023.
- v) CU Summer High School Program-
  - Investigations in Theoretical & Experimental Physics* [Summers '97-'17]
  - Mathematical BootCamp for Budding String Theorists* [Summers '09-'17]
- vi) Columbia Science Honors Program- Saturday Morning Lecture Series.
- vii) CU Physics Department- Undergraduate Curriculum Committee, AY90-99.
- viii) Barnard College Representative: CU SEAS 3-2 Engineering Program [AY94-97].
- ix) Columbia Physics Theory Seminar: full responsibility, AY90-93.