

JED ZACHARY BUCHWALD

EDUCATION

INSTITUTION	Degree	Date
Harvard University	Ph.D spvsr. Erwin Hiebert	1974
Harvard University	M.A.	1973
Princeton University	B.A. spvsr. Thomas Kuhn	1971

SOCIETIES ETC.

MacArthur Fellow (1995-2000)

American Philosophical Society, Member

Académie Internationale d'Histoires des Sciences, membre effectif.

American Association for the Advancement of Science, Fellow

Killam Fellow (Canada, 1990-1991).

ACADEMIC POSITIONS

2019-	Director, Caltech-Huntington Institute for the History of Science and Technology
2001-	Doris and Henry Dreyfuss Professor of History, California Institute of Technology
2004	Zeeman Visiting Professor, Dept. of Physics, University of Amsterdam
1992-2001:	Director, Dibner Institute for the History of Science and Technology, MIT.
1992-2001:	Bern Dibner Professor of the History of Science at MIT.
1991-1992:	Director, IHPST, University of Toronto.
1974-1992:	Lecturer to professor, IHPST, University of Toronto.

[IHPST = Institute for the History and Philosophy of Science and Technology]

CURRENT JOURNALS AND BOOK SERIES, EDITOR OR CO-EDITOR

2015-	(founding) series co-editor with Marjorie Senechal, <i>Mathematics in Culture and the Arts</i> (Springer)
2000-	(founding) series editor, <i>Transformations: Studies in the History of Science and Technology</i> (MIT Press)
1997-	editor, <i>Sources and Studies in the History of Mathematics and Physical Sciences</i> . (Springer)
1995-	co-editor with Jeremy Gray, <i>Archive for History of Exact Sciences</i> . (Board member since 1989) (Springer)
1994-	(founding) series editor, <i>Archimedes: New Studies in the History and Philosophy of Science and Technology</i> (Springer)

CURRENT EDITORIAL BOARDS

1997- editorial board, *Annals of Science*

1993- editorial board, *Science in Context*

1991- (founding) editorial board, *Perspectives on Science*

JED ZACHARY BUCHWALD

PUBLICATIONS

Books:

5. 2012 (with Mordechai Feingold) **Newton and the Origin of Civilization**. xii+530pp. Princeton University Press.
4. 2010 (with Diane Greco Josefowicz) **The Zodiac of Paris. How an Improbable Controversy over an Ancient Artifact Provoked Modern Debate over Religion and Science**. vi+440 pp. Princeton University Press.
3. 1994 **The Creation of Scientific Effects. Heinrich Hertz and Electric Waves**. xiv+500 pp. The University of Chicago Press. Hardcover and paper.
2. 1989 **The Rise of the Wave Theory of Light. Aspects of Optical Theory and Experiment in the First Third of the Nineteenth Century**. xxiv + 467 pp. The University of Chicago Press. Hardcover and paper.
1. 1985 **From Maxwell to Microphysics. Aspects of Electromagnetic Theory in the Last Quarter of the Nineteenth Century**. xiii + 339 pp. The University of Chicago Press, 1985 in hardcover; 1988 in paper.

Edited and co-edited volumes:

10. 2017 **The Romance of Science**. Edited. *Archimedes*, vol. 52. Edited with Larry Stewart.
9. 2013 **The Oxford Handbook of the History of Physics**. Edited with Robert Fox. 945 pages.
8. 2012 **A Master of Science History. Essays in Honor of Charles Coulston Gillispie**. Edited. *Archimedes*, vol. 30
7. 2005 **Wrong for the Right Reasons**. Edited, with an introduction, by J.Z. Buchwald and Allan Franklin. *Archimedes*, vol. 11.
6. 2004 “Fisica”, Part III of **Storia della Scienza**, vol. VII, pgs. 282-507. Edited by J. Z. Buchwald. *Istituto della Enciclopedia Italiana*.
5. 2001 **Histories of the Electron. The Birth of Microphysics**. Edited, with an introduction, by J. Z. Buchwald and A. Warwick. MIT Press.
4. 2000 **Isaac Newton’s Natural Philosophy**. Edited, with an introduction by J. Z. Buchwald and I. Bernard Cohen. MIT Press.
3. 1997 **Aspects of Mid to Late Nineteenth Century Electromagnetism**. Vol. 33 of *Physis*. Edited, with an introduction, by J. Z. Buchwald.
2. 1996 **Scientific Credibility and Technical Standards**, Kluwer. *Archimedes*, vol. 1. Edited, with an introduction, by J. Z. Buchwald.
1. 1995 **Scientific Practice: Theories and Stories of Physics**. Edited by J. Z. Buchwald. The University of Chicago Press.

Articles:

75. 2016 (with Chen-Pang Yeang) “Kirchhoff’s theory for optical diffraction, its predecessor and subsequent development: the resilience of an inconsistent theory,” *Archive for History of Exact Sciences*, 70, pp. 463-511.
74. 2016 “Politics, morality, innovation, and misrepresentation in physical science and technology,” *Physics in Perspective*, 18, pp. 283-300.
73. 2016 “Thomas Kuhn”, **Shifting Paradigms: Thomas S. Kuhn and the History of Science**, eds. Blum, Gavroglu, Joas and Renn, Max Planck

- Research Library for the History and Development of Knowledge, Proceedings 8, pp.151-162.
72. 2016 “Descartes on the Rainbow”, **The Cambridge Descartes Lexicon**, ed. L. Nolan, **Cambridge**, pp. 627-633.
71. 2013 “Electrodynamics from Thomson and Maxwell to Hertz,” in **The Oxford Handbook of the History of Physics**, pp. 571-583.
70. 2013 “Optics in the Nineteenth Century,” in **The Oxford Handbook of the History of Physics**, pp. 445-472.
69. 2013 “Electricity and Magnetism to Volta,” in **The Oxford Handbook of the History of Physics**, pp.432-444.
68. 2013 (with Robert Fox) Introduction. **The Oxford Handbook of the History of Physics**, pp. 1-7.
67. 2012 “Kuhn’s *Structure* Four and a Half Decades Later,” *Historical Studies in the Natural Sciences*, 42:485-90.
66. 2012 (with Diane Greco Josefowicz) “The cipher of the zodiac, review symposium response,” *Metascience*, 21.
65. 2012 “Cauchy’s theory of dispersion anticipated by Fresnel,” in **A Master of Science History**, *Archimedes*, 30: 399-416.
64. 2011 (with Diana Kormos Buchwald) “Martin J. Klein, 1924-2009,” *Biographical Memoirs of the National Academy of Sciences*, 1-16.
63. 2010 “A reminiscence of Thomas Kuhn,” *Perspectives on Science*, 18:279-83.
62. 2009 (with D. Graham Burnett) “Michael S. Mahoney, 1939-2008,” *Isis* 100:623-6. Reprinted in M. S. Mahoney, **Histories of Computing**, Harvard Univeristy Press, 2010.
61. 2007 “Descartes’ Experimental Journey Past the Prism and Through the Invisible World to the Rainbow”, *Annals of Science*, 65:1-46.
60. 2007 “Discrepant Measurements and Experimental Knowledge in the Early Modern Era”, *Archive for History of Exact Sciences*, 61:1-85.
59. 2006 “Huygens’ Experimental Determination of the Optical Parameters in Iceland Spar”, *Archive for History of Exact Sciences*, 60:67-81.
58. 2005 “An error within a mistake?”, in **Wrong for the Right Reasons**, *Archimedes*, vol. 11, ed. Buchwald and Franklin, Kluwer, 2005, pgs. 185-208.
57. 2005 Introduction (with A. Franklin) to **Wrong for the Right Reasons**, *Archimedes*, vol. 11, ed. Buchwald and Franklin, Kluwer, 2005, pgs. 1-16.
56. 2004 “Afterword: F. L. Holmes and the History of Science”, pgs, 193-202 in F. L. Holmes, **Investigative Pathways, Patterns and Stages in the Careers of Experimental Scientists**, New Haven: Yale University Press.
55. 2004 “Egyptian Stars Under Paris Skies”, *Engineering & Science*, 66: 20-31.
54. 2004 “Raggi e ondi luminosi”, chap. 34, Part III, vol. VII, pgs. 342-357 of **Storia della Scienza**, *Istituto della Enciclopedia Italiana*.
53. 2004 “L’elettromagnetismo e il campo”, chap. 39, Part III, vol. VII, pgs. 405-426 of **Storia della Scienza**, *Istituto della Enciclopedia Italiana*.
52. 2003 “Physics: Its methods, practitioners, boundaries”, co-authored with Sungook Hong, chap. 6 (pgs. 163-195) in **From Natural Philosophy to the Sciences: Historiographical Essays on Nineteenth-Century Science**, ed. David Cahan, The University of Chicago Press.
51. 2003 “Sadi Carnot and Augustin Jean Fresnel” in **The Oxford Companion to the History of Modern Science**, ed. John Heilbron, Oxford University Press.
50. 2003 “The Scholar’s Seeing Eye”, pgs. 309-25 in **Reworking the Bench: Research Notebooks in the History of Science**, ed. Jürgen Renn, Larry Holmes, Hans-Joerg Rheinberger (*Archimedes*, vol. 7) Kluwer:Dordrecht.

49. 2002 (with George E. Smith) "Incommensurability and the discontinuity of evidence", *Perspectives on Science*, 9:463-98.
48. 2002 "Comment Maxwell finit par triompher", *Les Cahiers de Science et Vie*, 67:86-96.
47. 2001 "Notas sobre conocimiento inarticulado, experimentacion y traduccion", *Theoria*, 17:243-63.
46. 2001 "A potential disagreement between Helmholtz and Hertz", *Archive for History of Exact Sciences*, 55:365-93.
45. 2000 "Reply to Mattingly", **Stud. Hist. Phil. Mod. Phys.**, 32:1-3.
44. 2000 "How the ether spawned the micro-world", pgs. 203-225 in **Biographies of Scientific Objects**, ed. Lorraine Daston. Chicago: the University of Chicago Press.
43. 1999 with Kostas Gavroglu, *Preface* to vol. 2 of *Archimedes, The Sciences in the European Periphery During the Enlightenment*, pgs. 7-11.
42. 1998 "Issues for the history of experimentation", pgs. 374-91 in *Experimental Essays – Versuche zum Experiment*, eds. M. Heidelberger and F. Steinle, Nomos Verlagsgesellschaft, Baden-Baden.
41. 1998 "Reflections on Hertz and the Hertzian dipole", in D. Baird et al. (eds.), **Heinrich Hertz: Classical Physicist, Modern Philosopher**, pp. 269-80.
40. 1998 (with George E. Smith) "Thomas S. Kuhn, 1922-1996", *Philosophy of Science*, 64:361-76.
39. 1997 Introduction to **Aspects of Mid to Late Nineteenth Century Electromagnetism**, *Physis*, vol. 33.
38. 1996 "Mathematics in 19th century physics", *Journal of the Center for Applied Computing*, Holland
37. 1996 Introduction to **Scientific Credibility and Technical Standards**, vol. 1 of *Archimedes*, pp.vii-ix.
36. 1995 "Why Hertz was right about cathode rays". In **Scientific Practice**, ed. J. Z. Buchwald, pp. 151-169.
35. 1995 "The practice of physics", with Sam Schweber. Concluding essay to **Scientific Practice**, ed. J. Z. Buchwald, pp. 345-352.
34. 1995 (with Tom Archibald) "Heinrich Hertz. La Scoperta delle onde elettriche", in **Cento Anni di Radio. Le Radici dell'Invenzione**, Torino:Edizioni Seat, pp. 123-174.
33. 1995 "Ottica, stòria déll': dal 1800 ai primi del novecento", **Enciclopedia Italiana delle Scienze**, pp.419-425.
32. 1995 "Heinrich Hertz's attempt to generate a novel account of evaporation", **No Truth Except in the Details**, ed. A. J. Kox and D. M. Siegel, Amsterdam:Kluwer.
31. 1994 "How Hertz fabricated Helmholtzian forces in his Karlsruhe laboratory", **Universalgenie Helmholtz**, ed. Lorenz Kruger, pp. 43-65. Berlin: Akademie Verlag.
30. 1994 "Elettricità", **Enciclopedia Italiana delle Scienze**, pp. 259-269.
29. 1994 (contributing editor for mechanics) **The Collected Papers of Albert Einstein**, vol. 3. Princeton: Princeton University Press.
28. 1994 "Kinds and (In)commensurability", **Trends in the Historiography of Science**, pp. 49-63.Kluwer:the Netherlands.
27. 1993 "Waves, philosophers and historians", *PSA*, 2:205-211.
26. 1993 "Helmholtz's electrodynamics in context: object states, laboratory practice and anti-Idealism." **Hermann von Helmholtz and the Foundations of Nineteenth-Century Science**, pgs. 334-373. Ed. D. Cahan. University of California Press.
25. 1993 "Campo, storia del concetto di," **Enciclopedia Italiana delle Scienze**, pgs. 483-492.
24. 1992 "Design for Experimenting". **World Changes. Thomas Kuhn and the Nature of Science**, pgs. 169-206. Ed. Paul Horwich. MIT.

23. 1992 "Kinds and the Wave Theory of Light". *Studies in the History and Philosophy of Science*, 23:39-74.
22. 1992 "The training of German research physicist Heinrich Hertz" in **The Invention of Physical Science**. Edited by J. Richards, M. J. Nye, and R. Stuewer. Kluwer.
21. 1992 "Why Stokes *never* wrote a treatise on optics". **The Investigation of Difficult Things**. Edited by Alan Shapiro and Peter Harman. Cambridge University Press.
20. 1992 Introduction (co-authored with Kurt Pedersen) to a translation by T. Archibald of *Erasmus Bartholin's Experimenta*. Royal Copenhagen Library.
19. 1990 "The background to Heinrich Hertz's experiments in electrodynamics". In **Nature, Experiment, and the Sciences**, eds. T. H. Levere and W. R. Shea, Dordrecht:Kluwer, pgs. 275-306.
18. 1989 "The battle between Arago and Biot over Fresnel". *Journal of Optics/Nouvelle Revue d'Optique*, 20, 109-117.
17. 1989 "The Invention of Polarization". In **New Trends in the History of Science**, Dordrecht.
16. 1989 "The Michelson Experiment and Electrodynamics circa 1900." In **The Michelson Era in American Science 1870-1930**. Eds. S. Goldberg & R. H. Stuewer. New York: AIP Conference Proceedings 179, 55-70.
15. 1985 "Oliver Heaviside: Maxwell's Apostle and Maxwellian Apostate", *Centaurus* 28, 288-330.
14. 1985 "Modifying the Continuum: methods of Maxwellian electrodynamics". In **Wranglers and Physicists**. Manchester: Manchester University Press, 225-41.
13. 1983 "Fresnel and Diffraction Theory", *Archives internationales d'histoire des sciences* 33, 36-111.
12. 1981 "The Quantitative Ether in the First Half of the Nineteenth Century". In **Conceptions of Ether**, ed. G. Cantor and M.J.S. Hodge. Cambridge: 215-37.
11. 1981 "The Abandonment of Maxwellian Electrodynamics: Joseph Larmor's Theory of the Electron", *Archives internationales d'histoire des sciences* 31: 135-180 and 373-438.
10. 1980 "Optics and the Theory of the Punctiform Ether", *Archive for History of Exact Sciences* 21, 245-78.
9. 1980 "Experimental Investigations of Double Refraction from Huygens to Malus", *Archive for History of Exact Sciences* 21, 311-73.
8. 1979 "The Hall Effect and Maxwellian Electrodynamics in the 1880's: The Discovery of a New Electric Field", *Centaurus* 23, 51-99.
7. 1979 "The Hall Effect and Maxwellian Electrodynamics in the 1880's: The Unification of Theory, 1881-1893", *Centaurus* 23, 131-75.
6. 1977 "William Thomson and the Mathematization of Faraday's Electrostatics", *Historical Studies in the Physical Sciences* 8, 101-36.
5. "Emilio Villari", **Dictionary of Scientific Biography**, 14: 32-3, ed. C. C. Gillispie et al. (New York).
4. "Leopoldo Nobili", **Dictionary of Scientific Biography**, 10: 134-6, ed. C. C. Gillispie et al. (New York).
3. "Macedonio Melloni", **Dictionary of Scientific Biography**, 9:264-5, ed. C. C. Gillispie et al. (New York).
2. "Ottaviano Fabrizio Mossotti", **Dictionary of Scientific Biography**, 9:547-9, ed. C. C. Gillispie et al. (New York).
1. "Sir William Thomson (Lord Kelvin)", **Dictionary of Scientific Biography**, 13: 374-88, ed. C. C. Gillispie et al. (New York).

JED ZACHARY BUCHWALD

CURRENT RESEARCH PROJECT:

Monograph (with Diane Greco Josefowicz) **The Stone that Spoke. The Battle Over the Decipherment of Egyptian Hieroglyphs.** Estimated completion, summer 2017. App. 400 pgs.

UNDERGRADUATE TEACHING

CALTECH Mechanics through the 18th Century
CALTECH Optics through the 19th Century
CALTECH Thermodynamics and Electromagnetism through the 19th century
CALTECH Historic experimentation
CALTECH Freshman seminar on Science from Babylon through the 17th Century
CALTECH Freshman Seminar on Ancient Mesopotamia
CALTECH Freshman Seminar on Polytheism and Monotheism
MIT Historic Experimentation
MIT UROP the design of an amateur observatory
TORONTO: History of Science (liberal arts students)
TORONTO: History of Science and Technology (engineering students)
TORONTO: History of Physics (physics students and upper-level engineers)
TORONTO: Physics 110 in the physics department
TORONTO: Adviser to several undergraduate theses

PhD SUPERVISION

[MIT]

Chen-Pang Yeang, **Characterizing Radio Channels** (1996-2001; PhD 2004)

Babak Razzaghe-Ashrafi: **Quantum electrodynamics and the origins of “hole theory”** (1996-2003)

Diane Greco, **Finding a Form: The Study of Terrestrial Magnetism at Göttingen, 1818-1839.** (1995-1999)

[MIT] supervisory board

Slava Gerovich, **Speaking Cybernetically: The Soviet Remaking of an American Science.** (1996-1999). With Loren Graham and Elizabeth Wood.

[University of Toronto] supervision

Sungook Hong [University of Seoul, South Korea]: **John Ambrose Fleming and the Origins of Science-Based Electrotechnology** (1991-1994)

Ed Jurkowitz, **The Two Historical Routes to the Super Problems in Quantum Mechanics.** (1988-1994)

T. Archibald, **German Electrodynamics in the Nineteenth Century** (1980-1987)

E. Reitan, **Neutral Motion before Galileo** (1984-1986)

C. G. Fraser, **The Approach of Jean d'Alembert to the Theory of a Constrained Dynamical System** (1979-1981)

D.H. Arnold, **The Mécanique Physique of Siméon Denis Poisson** (1976-1978)

GRADUATE TEACHING

Special history of science topics: Toronto and MIT.

Models and Model-making in the history of science

Early quantum mechanics; origins of information theory

Origins of the calculus

Micro entities and physical reasoning

JED ZACHARY BUCHWALD

Truth, Knowledge and Objectivity
Optics
Early modern science
Electromagnetism
Thermodynamics
Newton and the Principia
Newton and Optics
Quantum Theory of Dispersion
Mechanics, Galileo to Newton
Greek and Medieval Physics

History of physics survey: Toronto.

Reading courses on various topics; master's paper supervisions.

UNIVERSITY ADMINISTRATION AND COMMITTEES

CALTECH: member, Alumni Awards committee (2016-)

CALTECH: member, Watson Award committee (2015-)

CALTECH: member, Arts committee (2003-)

CALTECH: chair, Bacon Award (2003-)

CALTECH: chair, CIT/Huntington Searle Visiting Professor (2008-2011)

CALTECH: chair, history of science search (2009-2010)

CALTECH: chair, history of biology search (2003-2006)

CALTECH: chair, divisional advisory (2002-2006)

CALTECH: member, programs committee (2003-2006)

CALTECH: chair, history of early modern science search (2001-2)

CALTECH: chair, Millikan/Dabney transition committee (2001-2)

Housemaster, East Campus, MIT (97-01)

Chair, MIT committee on discipline (95-97)

Member, committee on discipline. MIT (93-97, 00-01)

Member, executive committee of the University of Toronto Centre for Computing
in the Humanities (89-92)

Chair, VIC communications and technology committee (89-90).

Member, VIC research committee (86-90).

Chair, VIC computer services committee (87-92).

OGS selection board member, 88; panel chair, 89; 90.

Member of the University of Toronto Computer Services Review Committee 78-
86.

IBM gift committee, University of Toronto, 78-86.

Chair, University of Toronto academic computing committee, 78-85.

IHPST Graduate Secretary 81-87.

[VIC = Victoria College, University of Toronto]

[OGS = Ontario Graduate Scholarships]

[IHPST = Institute for the History and Philosophy of Science and Technology]

GRANTS

SSHRC, Canada, co-investigator with Prof. Chen-Pang Yeang, grant held
through the University of Toronto, "The Transformation of Electromagnetic
Waves from a Novel Effect into a Research Object: 1887-1901," \$77,400
2015-2019

Mellon Foundation grant with M. Feingold and J. Brewer, "Evidentiary
Reasoning from Antiquity through the Early Modern Period"
\$750,000 2008-2011

JED ZACHARY BUCHWALD

Mellon Foundation grant with M. Feingold and J. Brewer, "The Guises of Eighteenth-Century Reason, 1650-1830", \$593,000	2004-2007
Sloan Foundation and Dibner Fund, "The history of recent science on the WEB". \$2,800,000. PI.	2000-2003
Sloan Foundation grant under the "Limits to knowledge" program PI. \$300,000	1997-1999
Research Grant. SSHRC	1992-1995
Research Grant. SSHRC	1990-1991
Research Grant. SSHRC	1988-1989
Research Grant and Leave Fellowship. SSHRC	1985-1986

[SSHRC = Social Science and Humanities Research Council, Canada]

03/2019