Curriculum Vitae breve de Andrew D. Garvin

Dr. Andrew D. Gavrin is Chair of the Department of Physics at Indiana University - Purdue University Indianapolis (IUPUI). His areas of specialization include physics education and the physics of nanostructured magnetic materials. His research is focused on Physics Education, particularly the use of communications technologies in face-to-face courses.

He is co-developer of the Just-in-Time Teaching (JiTT) method, and co-author of *Just-in-Time Teaching: Blending Active Learning with Web Technology.* He is a Fellow of the American Association of Physics Teachers, and a member of the Indiana University Faculty Academy on Excellence in Teaching.

He is also a consultant on technology in education, and on the development of science standards for Indiana K-12 schools. When he does get out of the office, he enjoys nature photography.

Anna Wolter

Curriculum Vitae et Studiorum

Education and Positions Held:

Present position: **Ricercatore Astronomo** at INAF-Osservatorio Astronomico di Brera, Milano (Italy).

27 Dec 2013 **Abilitazione Scientifica Nazionale**, i.e. National Academic Qualification as Associate Professor

2016-present Chair of the Regional board for Astronomy **Olympic Games**.

2015-present Member of the Editorial Board for the Italian **AstroEDU** site.

2013-present Member of the **IAU Division D Steering Committee**

2010-present **Italian Representative** of the ESO Science Outreach Network (**ESON**)

1991-present **Ricercatore Astronomo** at INAF-Osservatorio Astronomico di Brera, Milano (Italy). From November 1991 to August 1992 on maternity leave.

1990 **Harvard-Smithsonian Center for Astrophysics**, Cambridge, Mass. (USA). Visiting Scientist: to complete the EMSS atlas.

1990 **ESA-ESTEC**, Nordwijk. Visiting Scientist: to write scientific software for the community under ESA instructions.

1986-1990 **Harvard-Smithsonian Center for Astrophysics**. Cambridge, Mass. (USA) Physicist, High Energy Astrophysics Division. Survey of Einstein serendipitous sources. Analysis of X-ray sources. Multiwavelength studies. BL Lacs.

1986 **Harvard-Smithsonian Center for Astrophysics**, Cambridge, Mass. (USA). Visiting Scientist, High Energy Astrophysics Division. Analysis and software preparation for serendipitous sources detection and database preparation from Einstein data.

1980-1985 **Università degli Studi**, Milano, Facoltà di Scienze, Dipartimento di Fisica. Specialized courses: Radio Astronomy, Cosmic Physics. Laurea in Physics. Thesis on "The BL Lac Object PKS2155-304: results from EXOSAT observations". Advisor Dr. D. Maccagni, Co-advisor Prof. L. Maraschi. NB: at the time there was no higher Degree in Astrophysics in Italy

Born in Milano, 29 April 1960. 1 daugther.

Research Interests

After my degree in Milano, I moved to CfA where my scientific career began. I participated in constructing one of the best exploited surveys of X-ray sources, serendipitously found in the Einstein Observatory images. I dealt with all sort of X-ray emitters, from stars to clusters of galaxies, but the main interest was with the class of the highly luminous galaxy nuclei called BL Lacs, for which I studied the surface distribution and Luminosity Function in the X-ray band. More recently I moved from the point-like sources at the center of galaxies to

the diffuse/unresolved emission within them. I now devote much of my time to the study of UltraLuminous X-ray sources, a puzzling class of sources in external galaxies, which probably harbour heavy black holes, intermediate between the stellar ones and the supermassive at the center of galaxies, or might represent instances of super-Eddington accretion. The basic wavelength of interest is always the X-ray band, but I believe in a multi-wavelength approach to reach insight in astronomical quests. Therefore I worked with almost every energy band accessible. I am PI of successful optical, radio and X-ray observations of various celestial sources. I have always dedicated time to teaching and mentoring students. Since 2000 I devoted a significant fraction of my time to both Didactic and Outreach activities.

I summarize here the main topics of my studies:

Extragalactic X-ray Astronomy: statistical analysis of complete samples, X-ray source counts and XLF
Active Galactic Nuclei: observations and data analysis in X-ray and Gamma regimes with particular emphasis on BL Lac Objects
Study of Ultra Luminous X-ray sources in external galaxies
Study of diffuse X-ray emission: in galaxies and galaxy clusters

Selected bibliography

From the ADS database (scientific paper): Total number selected: 195 (of which 98 refereed). Total citations: 4655
See attached bibliography for a complete list of scientific works and a selected list of Outreach publications.

Recent service activity

Member of the Scientific Organizing Committee for the International Workshop "Exploring the X-ray Transient and Variable Sky" Pavia, 21-21 November 2016.

Member of the Local Organizing Committe for the National Finals of the Astronomy Olympic Games, Milano, May 2016.

Chair of the Local Organizing Committee for the Congress of the Italian Astronomical Society "Strutture cosmiche: dal Sistema Solare ai confini dell'Universo" Milano, 13-15 May 2014.

Member of the Scientific Organizing Committee for the Congress "Chandra's First Decade of Discovery" Boston, 22-25 September 2009.

Member of the Local Organizing Committee for the Congress "Accretion and Ejection in Agn: a Global View", Como, 22-26 June 2009.

Member of the Scientific Organizing Committee for the VIII National AGN congress in Torino, 17-19 May 2008.

Member of the Local Organizing Committee for the XLVIII Sait National Congress in Milano "I colori dell'universo: astronomia italiana dalla terra e dallo spazio" Milano, 19-23 April 2004.

Chair of several Time Allocation Committees for the Chandra X-ray observatory.

Member of several Time Allocation Committees for X-ray observatories (Chandra and XMM-Newton).

Member of the Italian Time Allocation Committees for radio telescopes (Noto and Medicina).

Member of several examining commissions for competitions at CNR and INAF.

Principal Investigator and coauthor of successful proposals for High Energy Observatories (Chandra, XMM-Newton, Integral, BeppoSAX, ASCA, ROSAT), and O/IR (ESO, TNG, S.Pedro Martir, Tirgo, ISO), and radio (VLA) telescopes.

Referee for various international scientific Journals (e.g. ApJ, A&A, MNRAS).

Editor of the proceedings for XLVIII Congresso Nazionale della SAIt, Supplemento ai Volumi delle Memorie della SAIt, "48-esimo Congresso della Società Astronomica Italiana: I Colori dell'Universo - Astronomia Italiana dalla Terra e dallo Spazio" Eds: Anna Wolter, Gianluca Israel e Francesca Bacciotti.

Scientific coordinator at national and local level of Research Projects financed by the Italian Space Agency (ASI).

Scientific coordinator at national and local level of Research Projects financed by the Istituto Nazionale di Astrofisica (INAF).

Educational and Outreach activity in last 10 years

Roles

2016-present Chair of the Regional Board for Italian Astronomy Olympic Games.

2015-present Member of the Editorial Board for the Italian **AstroEDU** site.

2010-present **Italian Representative** of the ESO Science Outreach Network (**ESON**)

Activities

Laboratory course for Optical Observations in the context of the Astrophysics curriculum at Universitá degli Studi di Milano for laurea and Dottorato students: AA 2011/2012; 2012-2013; 2013-2014; 2014-2015; 2015-2016; 2016-2017.

Monographic lessons in the context of the Astrophysics curriculum course at Universitá degli Studi di Milano-Bicocca, Facoltá di Scienze MFN: A.A. 2007/2008; 2008/2009.

Post-laurea and Post-Doc positions tutor in the Reasearch projects for which I am Scientific Coordinator.

Advisor for Laurea, Laurea Magistrale, Laurea Triennale thesis at Università degli Studi di Milano, Facoltá di Scienze MFN and Università di Milano Bicocca, Facoltà di Scienze MFN.

More than 50 conferences and lessons for high school and middle school classes on various astrophysical topics, under the "Public Outreach and Education" program at OAB.

More than 50 conferences and lessons for the public at large under the "Public Outreach and Education" program at OAB and self-organized. In particular at Observatory itself; at the Milano Hoepli Planetarium; at Universities for the elders; lessons for Physics teachers and students.

Participation as a guest to Television programs (most notably on April 2012 at the major Italian National Channel program "Uno Mattina")

Jury member and organizer for local (in Milano) and national (in Perugia) selection of FAME-LAB in Italy for 2014.

Organization of Outreach Events (Museo Nazionale di Storia Naturale; Festival della Scienza; Notte dei Ricercatori).

Technical Expertise

Proficiency in several astronomical data reduction packages (e.g. CIAO, FTOOLS, XSPEC, SAS, AIPS, IRAF, QDP, CASA)

Extensive experience in software writing, testing and documentation

Working knowledge of operating systems and programming languages (Fortran 77, python, SM, Unix OS - Linux, Mac OS)

Past experience with: IBM 370, Eclipse 3000, HP100, Sun Workstations, Digital VAX

Experience with astronomical databases

Experience operating ground-based optical telescopes and spectrographs

Professional Associations:
American Astronomical Society (AAS)
International Astronomical Union (IAU)

Financial Resources

Financial resources for my research activity come mainly from MIUR and ASI proposals.

1998 ASI "Osservazioni BeppoSAX - Blazar e galassie" EAPR400113 **Local PI**
1998 PRIN MIUR Studi Statistici di Campioni di Nuclei Galattici Attivi Selezionati in X
2000 ASI 1/R/27/00 Osservazioni SAX **Local PI**
2000 studi statistici di campioni di nuclei galattici attivi selezionati in X
2001 CNR-ASI I/R73/01 Osservazioni SAX **Local PI**
2001 PRIN MIUR Emissione X e Gamma da getti relativistici
2002 CNR-ASI I/R73/02 Osservazioni SAX **Local PI**
2003 PRIN MIUR La storia dell'accrescimento nell'Universo studiata nella banda X
2005 ASI-INAF I/023/05/0: Tracing galaxy evolution: the role of environment and AGN feedback **National PI**
2008 PRIN-INAF 2007-26 "Probing the Nature of Ultraluminous X-ray Sources" **Local PI**
2009 PRIN MIUR 2008 Studio dei getti relativistici e del fondo cosmico con i blazars

2012 PRIN-INAF-2011-1 “Challenging Ultraluminous X-ray sources: chasing their black holes and formation pathways” **Local PI**
2014 ASI - INAF I/037/12/0 “Accretion onto stellar and intermediate-mass compact objects with NuSTAR”
2016 ASI - INAF I/037/12/X “Accretion onto stellar and intermediate-mass compact objects with NuSTAR”

A brief summary of the astronomical topics under my study

All the activity mentioned here is with reference to the list of published papers.

EMSS: I started working at the Extended Medium Sensitivity Survey (EMSS) in 1986, at the High Energy Division of the Center for Astrophysics of the Smithsonian Astronomical Observatory (Cambridge, MASS - USA) in collaboration with Isabella Gioia, Tommaso Maccacaro and other colleagues. The aim was to construct a sizeable and statistically well defined sample of X-ray serendipitous sources, collected from the Einstein Observatory IPC images at high galactic latitude. The EMSS has been, for years, the reference point for Cosmology studies and for the statistical analysis of different properties of classes of X-ray emitters. Infact we were able to characterize all classes of astronomical sources that have X-ray detections, for the first time with a rigorous and statistically sound approach. The methodology used has been followed by a large fraction of the scientific community. My main interest in the project, beside the observations and informatic support, was on the BL Lac objects, subject of my Degree Thesis. They are active nuclei with a jet pointed at our line of sight, characterized by lack of emission lines, which I have studied further after the end of the EMSS work.

BL LACs and Blazars: I derived for the first time the surface density of BL Lacs with a statistical significant sample. Then I analyzed their cosmological evolution and luminosity function with the EMSS sample. The class now comprises also those objects with emission line that are dominated byt the jet and the interaction between the jet and the accretion disk, namely the Flat Spectrum Radio Quasars (FSRQs) under the general label of Blazars. I have obtained data in the X-ray band with BeppoSAX, Chandra and XMM-Newton to study the temporal evolution of the high energy emission, and with the VLA to study the morphology of radio jets. A subsample, that of the High-Peaked BL Lacs (HBL), with the synchrotron peak in the X-ray band, allows the selection of the TeV emitters.

QSOs: The radio loud AGN from the EMSS have been studied in the framework of a sequence of radio dominance and spectral appearance that include blazars. I have investigated the two subclasses of Flat spectrum and Steep spectrum AGN finding no significant differences in their evolutionary properties. I have also addressed the issue of obscuration, which, in the context of the Unified Model of AGNs should be linked to the line of sight to the dust torus that encompasses the nucleus, thereby excluding the direct view of the Broad Line Regions (BLRs). A number of "composite" objects that blur the definition have been derived, and a few objects with different behaviour in the optical and X-ray band have been found. Recently we have submitted a letter of interest to the newly launched Indian AstroSat observatory to pursue the issue.

Diffuse Emission: The study of galaxy cluster with the EMSS has led to the first assessment of negative cosmological evolution for the brightest sources. I have studied in detail a few single objects (e.g. RX J1821.6+6827 and NGC 4261). I have also collected data at various wavelengths for samples of local galaxies, that can be used as a testbed for cosmological surveys. We now know that the presence of hot gas in elliptical galaxies cannot be ascribed uniquely to their masses and optical luminosities, and it can range from virtually missing to being the dominant component in the energetic of the galaxy. At this time I am studying with a group of collegues including Ginevra Trinchieri and Roberto Rampazzo the relation between X-ray and optical/UV properties for a sample of early type galaxies.

ULXs: This is my main interest in the last years; with Luca Zampieri we have tried to gather a small Italian team including students and Post-Docs to attack the issue both from the observational and theoretical point of view. The Ultraluminous X-ray sources, non-nuclear

sources in which the observed luminosity is in excess of the Eddington luminosity for a normal-size stellar Black Hole (BH), have been heralded as the yet unknown host of Intermediate Mass Black Holes, of a thousand to 10 thousand solar masses, the missing link between the 10-20 solar mass BHs in our Milky Way and the supermassive BHs at the core of galaxies. Now that we have a better measure of the mass of a few objects the situation seems to be different: the mass of the BH is on the heavy side of the stellar mass distribution (i.e. 80-100 solar masses) with possibly a peculiar geometry or some other kind of super-Eddington accretion. I have studied in depth the Cartwheel galaxy, one of the most prolific host of ULXs, which for many years has had the record luminosity for its N.10 source. I have derived the luminosity function in the Cartwheel and in the interacting spiral NGC 2276 and results seem to confirm that ULXs are the high luminosity end of High Mass X-ray binaries. I am studying a sample of Ring Galaxies which host a large number of ULXs in order to derive the X-ray Luminosity Function of that peculiar enviroment. I have also coordinated the efforts of a small group of international scientists to assess the requirement for ULXs in the upcoming SKA telescope. Radio detections of ULXs are very scanty due to their distances and relative faintness. More recent results showing that at least a few ULXs are powered by Neutron Star have shfited the attention to other emission mechanism. We are both looking for variability in the available datasets and devising strategies to identify possible NS candidates via a spectral energy plane. See also my Research Plan for more details.

CATALINA ELIZABETH STERN FORGACH

ESTUDIOS:

LICENCIATURA EN FISICA UNAM: TESIS VARIABLES OCULTAS EN LA MECANICA CUANTICA (1976)

DOCTORADO FRANCIA (1981) : TESIS DIFFUSION RAYLEIGH ET DETECTION HETERODYNE. APPLICATION AUX FLUCTUATIONS ATMOSPHERIQUES

PHD MECANICA DE FLUIDOS USA (1988): TESIS MODE INTERACTION IN COUNTER ROTATING TAYLOR COUETTE FLOW

EXPERIENCIA LABORAL:

1974. Centre d'Estudes de Fonteney-Aux-Roses

1977 Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional

1981. Ciencias físico matemáticas y ciencias de la tierra

1984. Universidad de Houston

(1977 a la fecha) Universidad Nacional Autónoma de México

Directora de la Facultad de Ciencias de la UNAM (2016 a la fecha)

Publicaciones:

28 artículos de alto impacto en el área de fluidos

8 libros para la enseñanza de las ciencias naturales para nivel básico y medio

13 Capítulos de libro

50 cursos impartidos

22 tesis dirigidas

Distinciones

Xi OUTSTANDING GRADUATE STUDENT RESEARCH AWARD 1988

GALLERY OF FLUID MOTION 1998

1ER LUGAR GALERIA DE FLUIDOS 1999

1ER LUGAR GALERÍA DE FLUIDOS 2011

LATIN AMERICAN RESEARCH AWARD- GOOGLE 2015

GOOGLE LATIN AMERICAN RESEARCH AWARDS 2016

TERCER LUGAR PREMIO CANIFARMA 2016 EN INNOVACIÓN TECNOLÓGICA 2016

Resumen Curricular

César Eduardo Mora Ley se formó en la Universidad de Guadalajara como Licenciado en Física (1991), Licenciado en Enseñanza de las Matemáticas (1999), Especialista en Física Educativa (1989). Maestro en Ciencias en Física en el CINVESTAV-IPN (1994), y Doctor en Ciencias en la Universidad Autónoma Metropolitana (2001). Actualmente es Profesor Titular "C" de tiempo completo y Coordinador del Programa de Posgrado en Física Educativa del CICATA Legaria, del cual es fundador. Es miembro del Sistema Nacional de Investigadores, Nivel I. Sus principales áreas de trabajo son la Educación en Física y la Física Teórica. Sus más recientes actividades en proyectos de investigación en Enseñanza de la Física se muestran en las siguientes actividades:

-Organización de la red ***Latin American Physics Education Network*** **(LAPEN)**, en el Año Mundial de la Física 2005, de la cual fungió como Secretario Ejecutivo de 2005 a 2008, y como presidente de 2008 a 2014.
-Creación y coordinación del Programa del posgrado en Física Educativa en el CICATA Legaria desde 2006.
-Organización y dirección de la revista ***Latin American Journal of Physics Education***, siendo editor en jefe de 2007 a la fecha, www.lajpe.org.
-Organización y dirección de la revista ***Latin American Journal of Science Education***, siendo editor en jefe de 2013 a la fecha, www.lajse.org.
-Organización de la ***Sección México de la American Association of Physics Teachers*** **(AAPT-MX)** 2008, fungiendo como vice-presidente de 2008-2009, presidente de 2010-2012, presidente pasado de 2012-2013 y Representante ante AAPT-USA de 2014 a 2017.
-Organización de los talleres de Aprendizaje Activo de la Física en la región de Latinoamérica, siendo miembro del equipo ALOP de la UNESCO (Brasil 2007, México 2007, Argentina 2008, Colombia 2009, Chile 2010, México 2015).
-Presidente del Comité Organizador de la reunión **International Conference of Physics Education ICPE 2011** realizada en la Ciudad de México del 15 al 19 de Agosto de 2011.
-Organizador de la **International Winter School of Physics Education 2016**, de la red LAPEN en la Cd. Mx
-Presidente del Comité Organizador de la **XII Conferencia Interamericana de Educación en Física** (CIAEF), del 4 al 8 de julio de 2016, en el CGFIE-IPN (www.ciaf-iacpe.org).
-Creación de la **Asociación Latinoamericana de Investigación en Educación en Ciencias (LASERA)**, y organización de las conferencias y seminarios en Brasil, (2013), México, (2014), Colombia, (2015), Costa Rica (2016), siendo su actual presidente, y organizador de LASERA 2017 a realizarse del 24 al 27 de octubre en la Ciudad de México.

Otros puestos ocupados

-Jefe del Departamento de Matemáticas de la UPIBI (Instituto Politécnico Nacional, 1996-2005).
-Coordinador Académico del Posgrado en Física Educativa, (Instituto Politécnico Nacional, CICATA Legaria, 2006-2018).
- Subdirector Académico del CICATA Legaria (*Instituto Politécnico Nacional, 2007-2012).*

Participación en cuerpos académicos:

-International Commission of Physics Education (ICPE-IUPAP) Associate member (2006-2012).
-Inter American Committee of Physics Education (IACPE), Regular member (desde 2009 a la fecha).
-Group International de Recherche sur l'Enseignement de la Physique (GIREP) (miembro desde 2007 a la fecha).
-Latin American Physics Education Network (LAPEN) (desde 2005 a la fecha).
-American Association of Physics Teachers (AAPT) (desde 2006 a la fecha).
-Latin American Science Education Research Association (LASERA), Miembro de la mesa directiva desde 2013 a la fecha.
-Sociedad Mexicana de Física (SMF) (miembro regular desde 1993 a la fecha).
-Sociedad Cubana de Física (SCF) (miembro emérito desde 2008 a la fecha).
-Representante de Latinoamérica del *International Council of Associations for Science Education* (ICASE), a partir de octubre de 2016 a la fecha.
-Miembro del Comité Editorial de la revista *European Journal of Physics Education*, desde 2010 a la fecha.

-Miembro del Comité Editorial de la revista *Euro Asian Journal of Physics and Chemistry Education*, desde 2010 a la fecha.
-Miembro del Comité Editorial de la revista REAMEC, desde 2017 a la fecha.

Distinciones:

-Medalla al Mérito en el Doctorado en Ciencias (Universidad Autónoma Metropolitana, México 2001).
-Diploma por mejor estudiante de la carrera de Física (Universidad de Guadalajara, México 1990).
-Miembro Emérito de la Sociedad Cubana de Física, (La Habana, Cuba 2008).
-Profesor Asociado del Instituto Pedagógico Latinoamericano y Caribeño (La Habana, Cuba 2008).
-Medalla LAPEN al mérito académico (2016).
-Medalla GIREP al mérito académico 50 Aniversario (2016).

Curriculum Vitae breve de Christopher Moore

Christopher Moore is the Dr. George F. Haddix Community Chair in Physical Science and associate professor of physics education at the University of Nebraska Omaha.

Holding a M.S. in applied physics and a Ph.D. in chemistry from Virginia Commonwealth University, Dr. Moore has worked as a physical science teacher at several secondary schools in Virginia, as a professional materials scientist, and as a scholar of and consultant on physics education.

His education research focuses on the development of scientific reasoning and expert-like science practice abilities, with emphasis on practices that cross disciplines. This work has resulted in the publication of several dozen articles, invited speaker roles all over the world, and multiple awards including a Fulbright Scholar award.

He has developed pre- and in-service teacher training workshops on science practices in the Czech Republic, Mexico, and for school districts across the USA.

Elizabeth Mary Cavicchi

e.m.cavicchi@gmail.com
18 Clinton St.
Woburn MA 01801

EDUCATION

Harvard Graduate School of Education, Cambridge MA
Ed.D., Learning and Teaching, 1999. Dissertation: ``Experimenting with Wires, Batteries, Bulbs and the Induction Coil: Narratives of Teaching and Learning Physics in the Electrical Investigations of Laura, David, Jamie, Myself and the Nineteenth Century Investigators – Our Developments and Instruments".
Ed.M., Learning and Teaching, 1997.

Boston University, Boston MA
M.A.T., Education and Physics, 1986.

Massachusetts Institute of Technology, Cambridge MA
S.M.Vis.S. (Master of Science in Visual Studies), Environmental Art, 1980.
S.B., Physics, 1978.
S.B., Humanities and Science, 1978.

Fellowship Awards

Dibner Institute for the History of Science and Technology, MIT, Cambridge MA
Dibner Institute Postdoctoral Fellow, 2001-3.

Harvard Graduate School of Education, Cambridge MA
Advanced Doctoral Fellowship, 1997-1998.
Spencer Research Training Grant, 1994-1997.
Larson Research Fellowship, 1993-1994.

EXPERIENCE

Postdoctoral Researcher (2004-6)
Dibner Institute for the History of Science and Technology, MIT, Cambridge MA

Dibner Institute Postdoctoral Fellow (2001-2003)
Dibner Institute for the History of Science and Technology, MIT, Cambridge MA

Research Apprentice, Spencer Research Training Grant. (1994-1997)
Harvard Graduate School of Education, Cambridge MA

Researcher, Evaluator for Introductory University Physics Project. (1992-1994)
American Institute of Physics, College Park MD

Research Associate, Chemistry Department. (1988-1989)
University of Lowell Research Foundation, Lowell MA

Researcher, *The Ring of Truth*, six-hour PBS science series and book. (1985-1987)
Philip and Phylis Morrison, Public Broadcasting Associates, Cambridge MA

Research Technician, Physiology Department. (1982-1984)
Boston University School of Medicine, Boston MA

Teaching Experience

Instructor (2005-present)
Edgerton Center MIT, Cambridge MA
"Recreate Experiments from History – Create Experimental Research" SP726, SP713
"Recreate Experiments from History—Inform the Future from the Past" EC.050/090

Lecturer (2007); Instructor (2005)
Honors Program, University of Massachusetts Boston, MA
"Science Experimenting: Learning from Nature, History and Ourselves" Honors 290F

Lecturer. (2000)
Harvard Graduate School of Education, Cambridge MA
"Teaching Science" T215
"Exploring Water through Ways of Doing Art and Physics" T210E

Instructor in Education. (1999, 1997)
Harvard Graduate School of Education, Cambridge MA
"Exploring Water through Ways of Doing Art and Physics" T210E

Teaching Fellow, Learning and Teaching. (1996)
Harvard Graduate School of Education, Cambridge MA

Visiting Adjunct Faculty and Lecturer, Physics and Continuing Education. (1988-1992)
University of Massachusetts, Lowell MA

Adjunct Assistant Professor of Physics. (1985-1987)
Wentworth Institute of Technology, Boston MA

PUBLICATIONS and PAPERS

E. Cavicchi. "At Sea": Reversibility in Teaching and Learning. *Interchange*, 2018.

Heering, P. and Cavicchi, E., "Teaching about the Nature of Science through Historical Experiments" 2017 chapter, ed W. F. McComas.

E. Cavicchi. "Shaping and Being Shaped by Environments for Learning Science: Continuities with the Space and Democratic Vision of a Century Ago". *Science and Education, 26,* 2017. 529-556.

E. Cavicchi, "Dream Trains, Electromagnetic Possibilities and Trial Runs: Early Explorations in Electromagnetic Traction by Rail", In *Early Main Line Railways*. Cross-Rudkin, P. (ed.) . Clare, UK: Six Martlets Publishing, 2016.

E.Cavicchi, “Learning Science as Explorers: Historical Resonances, Inventive Instruments, Evolving Community”, in P. Heering, S. Klassen, D. Metz, *Enabling Scientific Understanding through Historical Instruments and Experiments in Formal and Non-Formal Learning Environments*, Flensburg Studies on the History and Philosophy of Science in Science Education, 65-86, vol. 2, Flensburg, Germany: Flensburg University Press, 2013.

E. Cavicchi, “Shadows of Light and History in Explorative Teaching and Learning”, In SILVA, C. C. & PRESTES, M. E. B. Learning science and about science through history and philosophy. Sao Paulo, Brazil: Editora da Livraria da Física/FAPESP, in press 2014.

W. Shorr, S. Hoidn, C. Lowry, E. Cavicchi, [eds.], *Always Wondering: A Mélange of Eleanor Duckworth and Critical Exploration*, Critical Exploration Press, 2013.

E. Cavicchi, "Explorando Péndulos en el Salón de Clases", in Z. Monroy-Nasr, G. Alvarez & R. León (eds.), *Enseñanza de la Ciencia*, 27-50, México: Facultad de Psicología y DGAPA, UNAM, 2012.

E. Cavicchi, “Time Traveling – An Intuitive Grasp of Time Takes Time”. In: *Science & Culture: Promise, Challenge and Demand*, Proceedings of 11th International History, Philosophy and Science Teaching Group Conference, Thessaloniki, Greece, Editors: Fanny Seralou, Vassilis Koulountzos, Anastasios Siatras. Publisher Epikentro, June 2011.

Cavicchi, E. (2011). The spiral conductor of Charles Grafton Page: Reconstructing experience with the body, more options, and ambiguity. In K. Staubermann (Ed.), *Reconstructions: Recreating Science and Technology of the Past* (pp. 127-170). Edinburgh, UK: National Museums Scotland.

Cavicchi, E. (2011). Classroom Explorations: Pendulums, Mirrors and Galileo’s Drama. *Interchange, 42* (1), 21–50.

E. Cavicchi, “Reflections on the Teaching of Gerbert of Aurillac”, in *Orbe Novus*, C. Sigismondi, ed., Universitalia, Rome, 2010, 7-21.
http://irsol.ch/costantino_sigismondi/OrbeNovus_volume2010.pdf

E. Cavicchi, “Activity inspired by Medieval Observers with Tubes”, in *Orbe Novus*, C. Sigismondi, ed., Universitalia, Rome, 2010, 22-39.
http://irsol.ch/costantino_sigismondi/OrbeNovus_volume2010.pdf

E. Cavicchi, “Exploring Mirrors, Recreating Science and History, Becoming a Class Community”, *New Educator*, 5(3), 2009, 249-273.
http://www1.ccny.cuny.edu/prospective/education/theneweducator/volume5_3.cfm

E. Cavicchi, S-M Chiu, F. McDonnell, “Introductory Paper on Critical Explorations in Teaching Art, Science and Teacher Education”, *New Educator*, 5(3), 2009, 189-204.
http://www1.ccny.cuny.edu/prospective/education/theneweducator/volume5_3.cfm

E. Cavicchi, “Earth Grounds and Heavenly Spires: Lightning Rod Men, Patent Inventors and Telegraphers”, chapter for *Playing with Fire: Histories of the Lightning Rod*, Peter Heering,

Oliver Hochadel, David Rhees (Eds.):. Philadelphia: American Philosophical Society, 2009, 181-205.

E. Cavicchi, "Charles Grafton Page's Experiment with a Spiral Conductor", *Technology and Culture*, 49, 2008, 884-907.

E. Cavicchi, "Opening Possibilities in Experimental Science and its History: Critical Explorations with Pendulums and Singing Tubes", *Interchange*, 39, 2008, 415-442.

E. Cavicchi, "A Witness Account of Solar Microscope Projections: Collective Acts integrating across Personal and Historical Memory", *British Journal for the History of Science*, 41, 2008, 369-383.

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E. Cavicchi, "Changing Minds: Computers, learning and literacy, Andrea A. DiSessa" (review), in *Education, Communication & Information*, 2 (2), 2002, 249-253.

E. Cavicchi, F. Hughes-McDonnell, P. Lucht, ``Playing with Light", *Educational Action Research*, **9**, 2001, 25-49.

E. Cavicchi, ``Experimenting with Wires, Batteries, Bulbs and the Induction Coil: Narratives of Teaching and Learning Physics in the Electrical Investigations of Laura, David, Jamie, Myself and the Nineteenth Century Experimenters -- Our Developments and Instruments", Dissertation, Harvard University, 1999.

E. Cavicchi, "Experimenting with magnetism: Ways of learning of Joann and Faraday", *American Journal of Physics*, **65**, 1997, 867-882.

E. Cavicchi, "Watching Galileo's Learning", in *Explorations in College Algebra*, Linda Kime and Judy Clark, (John Wiley: NY) 1997.

CURRICULUM VITAE

Nombre: HECTOR G. RIVEROS ROTGE
Fecha de Nacimiento: 16 de octubre de 1940, en México, D.F. RIRH401016-R4A
Investigador Titular C, Tiempo completo

ESTUDIOS EN LA UNAM
Doctorado: 16 de noviembre 1973
Profesor de Física: desde 1961 a la fecha
Investigador del IFUNAM desde 1964 a la fecha
Area principal de trabajo: Estado sólido - Crecimiento de cristales.
Enseñanza. Contaminación atmosférica. Energía Solar.
Tesis dirigidas 31, Licenciatura 19, Maestría 10, Doctorado 2

PUBLICACIONES: 96 artículos de investigación, 27 in extenso en congresos, 318 divulgación y enseñanza.
LIBROS: 19 , Notas de cursos: 13

1. Física II Modulo5 (Electromagnetismo) Colegio de Bachilleres, Limusa Wiley - 1976
2. Física III Modulo 7 (Ondas) Colegio de Bachilleres - Limusa Wiley - 1980
3. Método Científico Experimental - C.C.H. UNAM - 1980
4. - El método científico aplicado a las ciencias experimentales. Editorial Trillas – 1982
5. - Iniciación al método científico experimental, Editorial Trillas - 1985. Todos con L. Rosas.
6. Técnicas de Laboratorio, Area de Física, Modulo IV, Colegio de Bachilleres, (3000 ejem)1980.
7. Electricidad: Preguntas y respuestas. Octubre 1998. Trillas.
8. Emisiones Vehiculares, con E. Cabrera, De. PUMA- UNAM, Enero 1999.
9. Experimentos Impactantes, con Colado y Mieres, Trillas. Julio 2000
10. Como mejorar mi clase de Física, con Emma Jiménez y David Riveros, Trillas 2004
11. Método Científico Experimental, con A. Julian y H. Riveros Rosas, Trillas publicado 2009
12. CRECIMIENTO DE CRISTALES, Editorial Academica Española 2017
13. Placer de Razonar I
14. Placer de Razonar II
15. Placer de Razonar III

PELICULAS:

1. Crecimiento de cristales - 15 minutos - 16 mm.
2. Resonancia y modos normales - 8 minutos - super 8
3. Tensión superficial - 8 minutos - super 8
4. Pompas de jabón, Video digital
5. 143 videos en youtube.com/ifunam y 104 en el UniversalTV – Ciencia

CURSOS CORTOS IMPARTIDOS: 136, 98 Nacionales, 38 Internacionales
Conferencias o seminarios: 347 + Magistrales 184 (Internacionales 64, Nacionales 122) =531

TRABAJOS EN CONGRESOS: 166
OTROS: Diseño de la parte experimental del plan de estudios de la UAM- Iztapalapa.

PUESTOS ADMINISTRATIVOS

- Jefe de los laboratorios de Física de la Facultad de Ciencias, UNAM 1966 - 1968
- Jefe de Departamento - Instituto de Física, UNAM, 1986 - 1987
- Secretario Académico del Centro de Instrumentos, UNAM, 1976 - 1978
- Jefe de Depto. - CINVESTAV - Mérida, 1981-1982
- Coordinador de Licenciatura - Consejo Departamental FCUNAM 85-87

SOCIEDADES CIENTIFICAS A LAS QUE PERTENECE

- Sociedad Mexicana de Física
- Academia de la Investigación Científica
- American Society for Crystal Growth
- Sociedad Mexicana de Instrumentación

- American Association of Physics Teachers
- Sociedad Mexicana de Cristalografía

ORGANIZADOR DE LOS SIGUIENTES SIMPOSIOS

- III Simposio de Estado Sólido 1981
- VIII Simposio Latinoamericano en Física del Estado Sólido 1983
- I Simposio Nacional de Estado Sólido 1986
- II Simposio Nacional de Estado Sólido 1987
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CONFERENCIAS INTERNACIONALES

1. Interamerican Conference on Physics Education - Miembro Comité Internacional.
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Curriculum Vitae

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Highest diploma/degree: master in physics, aggregation for teaching physics (upper secondary level)
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List of major research achievements:
Science exhibition conceptions
Physics education articles in local teacher association bulletins
Active participation to science congresses in Italy and France; presentation of experiments and workshops

Experience in education and/or promotion of science:
Participation to Fibonacci EU project.
Participation to Restarts EU project.
Amgen Teach project, Belgium promoter.
Pedagogical advisor for upper secondary education (physics).

Other experience that may be useful for realization of the project :
At University, I'm involved in the training of the future teachers (physics) and all kinds of projects for engineer and physics students.