

LAWRENCE R. SULAK - CURRICULUM VITAE

EDUCATION

- 1971 Ph.D., 1968 A.M., Physics, Princeton University, Advisor: Professor Val L. Fitch, Nobel Laureate (1980)
Thesis: "A Precise Measurement of the $K_1^0 - K_2^0$ Mass Difference" (the first at the 1% level, cited 15 times)
- 1966 B.S., Physics, Carnegie Mellon University, citation: "highest academic record in the class of 1966"
Advisor: Professor Lincoln Wolfenstein

POSITIONS AND ASSOCIATIONS AFTER HIGHEST DEGREE

- 2014-15 Chairman, US/CMS/HCAL Institution Board
- 2013-present CMS HCAL Radiation Damage Taskforce
- 2012-present US CMS Upgrade Steering Committee, member
- 2012-2013 Search Committee for Fermilab Director, Fermi Research Alliance
- 2012-present Advisory Board, CMS Hadron Calorimeter Project
- 2011-2014 Board of Directors, Fermi Research Alliance (operator of Fermilab for the DOE)
- 2011-2012 Chairman, US/CMS/HCAL Institution Board
- 2011-present Member, CERN Delegation with Ecuador to sign Protocol for Collaboration on Education, Science and Engineering
- 2011-present Lead delegate, CERN Delegation to Tunisia to draft Protocol for Collaboration on Education, Science and Engineering
- 2010-present Technical Advisor to CMS-HCAL Project Manager, to CMS-HCAL Integration Manager, and to CMS Upgrade Manager
- 2010-present Attaché scientifique, Physicien, European Center for Nuclear Research (CERN), Geneva, Switzerland
- 2009-present Member, Boston Energy Forum: BU, Harvard & MIT physicists and nuclear engineers providing information on US energy and environmental security to Congressmen and the public; co-author of white paper
- 2009-present Founder, Director, Boston University/CERN Undergraduate Physics Semester Abroad Program, only one in the world
- 2009-present CMS HCAL Upgrade Taskforce
- 2008-present "Keep Physicist Bill Foster in Congress," Finance Committee Member
- 2007-2008 External Advisory Board, Member, "Physics Frontier Center" Proposal, Institute for Advanced Study, Princeton, NJ
- 2006-present Board of Directors, University of Quito, Ecuador, in part for initiating BU/Quito scientific collaborations
- 2003-2005 Guggenheim Foundation Fellow. Project: launching Antares Neutrino Observatory and scaling it to Km^3
- 2003-2005 Visiting Professor, University of the Mediterranean, Luminy, Marseille, France
- 2003-2005 Senior Research Scientist, Center for Particle Physics of Marseille (CPPM), Marseille, France
- 2003 Institut de Français, Villefranche-sur-Mer, France, Diplôme de la langue française
- 2001-present Fellow, University Professors Program, Boston University
- 1993-1994 Distinguished Visiting Scientist, IN2P3 and CEA, Centre d'Etude, Saclay, Gif-sur-Yvette, France
- 1990-present David M. Myers Distinguished Professor, Boston University endowed chair
- 1985-2005 Chairman, Professor of Physics, Boston University; built Physics and facilities to rank among all private US institutions:
1st in citations/paper and 9th or better in # of refereed papers, # of citations, and in external funding (2003 statistics from
Spires, AIP, and the Institute for Scientific Information)
- 1979-1981 Harvard University, Visiting Professor of Physics, Cambridge, MA
- 1979-1984 Associate Professor of Physics (with tenure), University of Michigan, Ann Arbor, MI
- 1975-1979 Harvard University, Associate Professor of Physics, Cambridge, MA
- 1974-present Guest Associate Physicist, Brookhaven National Laboratory, Upton, NY
- 1971-1976 Visiting Physicist, Fermi National Accelerator Laboratory, Batavia, IL
- 1971-1975 Harvard University, Assistant Professor of Physics, Cambridge, MA
- 1970-2010 Visiting Scientist, European Center for Nuclear Research (CERN), Geneva, Switzerland
- 1970-1971 Chargé de Recherche, Département de Physique Nucléaire et Corpusculaire, Université de Genève, Switzerland

AWARDS AND HONORS

- 2011 Distinguished Lecture, "Recreating the Big Bang", All Ecuador Science Convocation, including radio interview
- 2006 Most Distinguished Alumnus Award, 2006, Carnegie Mellon University
- 2006 All University Lecture, Carnegie Mellon University
- 2005 Marseille Research Award, for Seminal Contributions to Antares Neutrino Observatory
- 2001- Fellow, University Professors Program, Boston University
- 1998 One of 10 "Greatest Science Achievements of 1998: Discovery of neutrino mass," awarded by *Popular Science* to Super-K
- 1998 ASAHI Prize, "Discovery of the Finite Mass of Neutrinos," shared with Super-K collaborators
- 1992 "Faces & Names to Watch..." *Boston Magazine* (see Vol. 48, No. 12, 1992)
- 1992-present Who's Who in Science and Engineering
- 1990-present David M. Myers Distinguished Professor, Boston University
- 1989 Bruno Rossi Prize, American Astronomical Society for "Discovery of Neutrinos from Supernova 1987a" awarded to the IMB collaboration
- 1984 Outstanding Young Scientist Award, "America's 100 Brightest Scientists," *Science Digest* (December 1984)
- 1984-1986 Faculty Research Honorary Society, University of Michigan Research Club
- 1984-present Fellow, American Physical Society
- 1966-1970 National Science Foundation Fellow, Princeton University
- 1966-present Omicron Delta Kappa National, Leadership Honor Society
- 1963 1963 Outstanding Freshman Physicist, awarded by Carnegie Mellon University
- 1962-1966 Alfred Noyes Smith Scholar, Carnegie Mellon University

PUBLICATIONS Before the LHC started in 2011, LRS played a major role in > 500 papers that were cited > 40,000 times*, including 22 renown (500+ cites), 15 famous (250-499), 52 very well known (100-249), 58 well-known (50-99), and 203 known papers (10-49 cites). Since the start of LHC, LRS appears in the CMS author list of > 330 additional published papers with > 17,000 citations.

RESEARCH FUNDING

2011-present DOE awards as co-PI for 1) Super-K and T2K and 2) Physics with CMS Detector at the Large Hadron Collider at CERN
3) The BU Undergraduate Internship Program at CERN

2010-12 Fermilab funding, Ass't to Project Manager of CMS HCAL, CERN

1986 Initiator of U.S. Department of Energy Grant at Boston University; PI or Co-PI of 3 tasks
1) Proton Decay and Neutrino Astrophysics (including IMB to '90, MACRO to '96, Antares Neutrino detector 2003-05),
2) Muon g-2 Experiment,
3) CMS Forward Cherenkov Calorimeter

1978-1984 Founder of IMB Proton Decay DOE Task at University of Michigan, transferred from initial work at Harvard

SELECTED RECENT SCIENTIFIC PRESENTATION

2014 Colloquium (scheduled), Boston College, *"It really looks like, and quacks like, the Higgs boson"*

2013 *"Gerontocracy in Physics?"* PBS News Hour interview by Paul Solomon, with Sheldon Glashow
Saturday Morning Live, Goodwin House, Alexandria VA, *"Without those 'sticky' Higgs bosons, you'd be traveling at light speed"*
Special Lecture, Maranatha Collegiate Academy, BWI, *"The Discovery of the Origin of Mass"*
Distinguished Lecture, Dartmouth College, *"Discovery of the Source of mass at the LHC?"*

2012 IXth Latin American Symposium on High Energy Physics, *"Jet Production and Properties at Hadron Colliders"* Sao Paulo, Brazil, joint contribution for both CMS and ATLAS
Collins Memorial Lecture, Massachusetts General Hospital *"Without those 'sticky' Higgs bosons, you'd be traveling at light speed"*
Colloquium, Gran Sasso National Laboratory, *"Observation of a new fundamental boson?...and future prospects, upgrades, etc."*
Seminar, US DOE, Germantown, *"A head-start in international physics for American undergrads: The BU Internship at CERN"*
Seminar, US DOE, Germantown, *"Fermilab as Viewed from Abroad"*

2011 All Ecuador Symposium on Particle Physics, National Concert Hall, Quito *"Recreating the Birth of our Universe,"* in Spanish
Conference on CERN Physics, Ministry of Education and Research, Quito, *"CMS, CERN and Ecuador,"* in Spanish
Conference on CERN Physics, Ministry of Technology and Higher Education, Tunis, *"CMS, CERN and Tunisia,"* in French

2010 All BU Undergraduate Lecture, *"From the Big Bang...to the death of the Universe,"* inaugural lecture, "Conversations with Physicists" series

2009 *"Irradiation Studies of Silicon Photomultipliers,"* CMS Upgrade Workshop, Fermilab
"Resuscitation of the CMS Forward Hadronic Calorimeter," HCAL Upgrade Workshop
Inaugural talk, *"Observations from the Antares Neutrino Telescope,"* Boston University Particle Physics Seminar Series
"The Boston Junior Semester at CERN," University of Geneva, Switzerland

2008 Keynote presentation: *"La naissance de l'astronomie du neutrino et son avenir,"* joint with R. Aymar, CERN Director General, at 25th Anniversary Symposium, Center for Particle Physics, Marseille, France (delivered in French)
Colloquium, McGill University, *"The Birth of Neutrino Astronomy,"* Montreal, Canada

2007 *"Forward Cherenkov Calorimetry at CMS,"* Center for Particle Physics, University of Marseille, France
University Professors Program Lecture, *"Cosmology for the Layman: from the big bang to the demise of the universe,"*

2006 Collins Lecture, *"Are diamonds forever? the Demise of the Proton,"* Massachusetts General Hospital, Boston
All University Lecture, Carnegie Mellon University, *"From the Big Bang...to the demise of the Universe,"*

2005 Invited talk, International Conference on the High Energy Frontier, *"The Future of Cherenkov Ring-Image Calorimetry,"*
HIF '05, Elba, France, May 28-June 1, 2005
Biannual Antares Collaboration Meeting, CERN, *"Status of Electronic Development for Antares,"* January 2005
Invited presentation to Region of Aix-en-Provence, France: *"The Value of the ITER Project to Science,"* Co-presenters:
Mayor of Aix; President of Region of Aix; Director, Cadarache Nuclear Research Lab (French Los Alamos)
Invited talk, 40th Rencontre de Moriond, *"Searches for Proton Decay and Neutrino Oscillations: Physics from Cherenkov Ring-Image Calorimetry,"* French Physical Society International Conference, March 2005
Invited talk, Rencontre d'Aosta, *"Progress of the Antares Experiment,"* Italian Physical Society International Conference
National Presbyterian School, Washington DC, November 21-26, 2005, series of 4 lecture/demonstrations

2004 Invited presentation, 25th International Neutrino Conference, Paris, France
Invited speaker, CPPM Conference on the Future of Particle Physics in Europe, *"Megaton and Cubic Kilometer Detectors: the non-accelerator future for particle physics,"*
Featured speaker to Ministers of Science from France, Germany, Italy, Great Britain, and Spain, Inauguration of Antares Neutrino Observatory
Invited presentation, Ecole Polytechnique, Rene Turlay Memorial Conference, Paris
3 Invited talks, Int'l School for Particle Astrophysics, Erice, Italy: on Super-K, K2K, and Antares, . . .

SELECTED SCIENTIFIC PUBLICATIONS

Discovery of a Fundamental Boson, consistent with the Higgs particle that completes the Standard Model, with collaborators at CMS. Invented and prototyped the forward Cherenkov quartz-fiber calorimeter essential to observing the boson produced in the vector boson fusion channel. "Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC," CMS Collaboration (Serguei Chatrchyan (Yerevan Phys. Inst.) et al.). Jul 2012. Phys.Lett. B716 (2012) 30-61. j.physletb.2012.08.021. e-Print: arXiv:1207.7235. LRS contributed to the $H \rightarrow WW \rightarrow l\nu l$ analysis. (>680 cites)

Discovery of Oscillation of Neutrinos and of Neutrino Mass...first physics beyond the Standard Model 1978 - 1998

First proposal for a massive underground ring-imaging water Cherenkov detector, focusing on both the detection of proton decay and the identification of the critical signature for neutrino oscillations (the ratio of muon- to electron-neutrino induced events).

"Studies of a Detector to Test for Baryon Stability to a Lifetime of 10^{33} Years," L. R. Sulak, Proceedings of the Seminar on Proton Stability, Madison (D. Cline, ed.) 8 December 1978, p. A1; also Harvard University Particle Physics Preprint HUPP 252. "A Nucleon Decay Search: Design of a New Experiment Sensitive to a Lifetime of 10^{33} Years," B. Cortez et al., Int'l Conf. on Neutrino Physics 1979 (A. Haadtuft and C. Jarlskog, ed.), Trykk: Astvedt Industrier A/S, Vol. 3 (1979), p. 121.

First proposal of the up/down asymmetry technique to search for neutrino oscillations, which led to their discovery.

"A Long Baseline Neutrino Oscillation Experiment Sensitive to Mass Differences of Hundredths of an Electron Volt", B. Cortez and L.R. Sulak, Unification of the Fundamental Particle Interactions (S. Ferrara, J. Ellis, and P. Van Nieuwenhuizen, eds.) Erice, March 17-24, 1980, Plenum Press, (1980), pp. 661-671.

"The Irvine-Michigan-Brookhaven Nucleon Decay Facility: Status Report on a Proton Decay Experiment Sensitive to a Lifetime of 10^{33} Years," and a Long Baseline Neutrino Oscillation Experiment Sensitive to Mass Differences of Hundredths of an Electron Volt, L. Sulak, First Workshop on Grand Unification (Paul H. Frampton, Sheldon L. Glashow, Asim Yildiz, eds.), April 10-12, Math Sci. Press, University of New Hampshire, (1980), p. 163.

"Neutrino Oscillation Search With Cosmic Ray Neutrinos," D.S. Ayres, B. Cortez, T. K. Gaisser, A.K. Mann, R. E. Shrock, L. R. Sulak. Phys. Rev. D29:902,1984. (>30 cites)

With the IMB detector, the first observation of a muon deficit in the cosmic ray atmospheric neutrino, after only one live year of data taking. "A Search for Nucleon Decay Into Lepton and K^0 ," B. Cortez, Harvard University Ph.D. Thesis, PhD advisor: LRS, September 1983

First refereed publication of a deficit of atmospheric muon neutrinos (relative to the number of electron neutrinos), precursor to the discovery of neutrino oscillations:

"Calculation of Atmospheric Neutrino Induced Backgrounds in a Nucleon Decay Search," T.J. Haines et al., Phys. Rev. Lett. 57, (1986) (107 cites)

"Measurement of Atmospheric Neutrino Composition with IMB-3, D. Casper *et al.*, Phys. Rev. Lett. 66, p 2561, 1991. PhD thesis, LRS as PhD advisor. (>570 cites)

"The Electron-neutrino and muon-neutrino content of the atmospheric flux," R. Becker-Szendy *et al.* Phys.Rev.D46:3720-3724, 1992. (>750 cites)

"Neutrino measurements with the IMB detector," R. Becker-Szendy *et al.* 1995, Nucl.Phys.Proc.Suppl.38:331-336, 1995. (>180 cites)

"A Search for muon-neutrino oscillations with the IMB detector," R. Becker-Szendy *et al.* Phys.Rev.Lett.69:1010-1013,1992. (>170 cites)

"IMB-3: A Large water Cherenkov detector for nucleon decay and neutrino interactions," R. Becker-Szendy *et al.* Nucl. Instrum. Meth. A324:363-382,1993. (>35 cites)

Super-K high statistics proof of the oscillation of muon neutrinos and the unexpected non-zero mass of the neutrino, the first observation of physics beyond the standard model. This paper cited >3400 times; the series of papers on this topic has been cited over 4600 times, the most highly cited experimental particle physics work ever. "Evidence for Oscillation of Atmospheric Neutrinos," Y. Fukuda et al., Phys. Rev. Lett. 81 (1998) p. 1562-1567. (>3400 cites)

"Measurement of a small atmospheric muon-neutrino / electron-neutrino ratio," By Super-Kamiokande Collaboration (Y. Fukuda *et al.*). Phys.Lett.B433:9-18,1998. e-Print: hep-ex/9803006 (>815 cites)

Super-K demonstration that oscillations of muon neutrinos most likely into tau neutrinos. "Tau Neutrinos Favored Over Sterile Neutrinos in Atmospheric Muon Neutrino Oscillation," S. Fukuda et al., Super-Kamiokande Collaboration, Phys. Rev. Lett. (2000). (>760 cites)

Accelerator muon-neutrinos from KEK to Super-K (the K2K experiment) oscillate as atmospheric neutrinos 1998

Confirmation that accelerator muon-neutrinos oscillate with the same characteristics as atmospheric neutrinos.

"Detection of accelerator produced neutrinos at a distance of 250-km," by K2K Collaboration (S.H. Ahn *et al.*). Phys.Lett.B511:178-184, 2001. e-Print: hep-ex/0103001 (>270 cites)

"Evidence for muon neutrino oscillation in an accelerator-based experiment," by K2K Collaboration (E. Aliu *et al.*). Phys. Rev. Lett.94:081802, 2005. e-Print: hep-ex/0411038 (>360 cites)

"Measurement of Neutrino Oscillation by the K2K Experiment," by K2K Collaboration (M.H. Ahn *et al.*) Phys.Rev.D74: 072003, 2006. e-Print: hep-ex/0606032 (>270 cites)

Discovery of Neutrinos from a Supernova collapse 1987

First observation of extra-galactic neutrinos from the gravitational collapse of a supernova (also observed by the Kamiokande Detector).

"Observation of a Neutrino Burst in Coincidence with Supernova 1987A in the Large Magellanic Cloud," R.M. Bionta, *et al.*, Phys. Rev. Lett., Vol. 58, No. 14 (6 April 1987), p. 1494. Bionta was LRS' postdoc (>773 cites)

"Angular Distribution Of Events From SN1987a," by IMB Collaboration (C.B. Bratton *et al.*) Phys.Rev.D37:3361,1988. (>105 cites)

Searches for the Ultimate Decay of the Proton and for Grand Unification 1983

First limit on proton lifetime at Grand Unification scale, 5 orders of magnitude better than previous measurements. Elimination of simplest and most elegant theory, SU5. LRS PI, originator of technology and founding advocate of H₂O ring-imaging Cherenkov calorimetry.

"A Search for Proton Decay into $e^+ \pi^0$," R.M. Bionta *et al.*, Phys. Rev. Lett., Vol. 51, No. 1, 27 (4 July 1983) (>150 cites)

"Search for Nucleon Decay into $\mu^- K^0$ and νK^0 ," B. G. Cortez *et al.*, Phys. Rev. Lett., Vol., 52 (26 March 1984). (>30 cites)

Limits on 44 decay modes of the nucleon, many remain world records to date.

"A Search for Nucleon Decay Using the IMB-3 Detector," C. McGrew *et al.*, Phys. Rev. D59 (1999) p. 5204.

"Massive Cherenkov neutrino facilities: their evolution, their future," Celebration of Twenty-five years of international neutrino conferences. L.R. Sulak (Boston U. & Marseille, CPPM). 2005. 10pp. 21st International Conference on Neutrino Physics and Astrophysics (Neutrino 2004), Paris, France, 14-19 Jun 2004. Published in Nucl. Phys. Proc. Suppl. 143:317-326, 2005. Also in "Paris 2004, Neutrino physics and astrophysics" 317-326

Neutrino astronomy: Development of Massive Water Ring-Imaging Calorimetry for IMB, Super-K, and Antares 1976 - present

First conceptual design for a massive undersea ring-imaging water Cherenkov detector

"Signatures of High Energy Neutrino Interactions and their Detection Via Cherenkov Light", L.R. Sulak *et al.*, Proceedings of the 1976 DUMAND Summer Study, (A. Roberts, ed.) Honolulu, 6-19 September 1976, p. 297

"Search for dark matter wimps using upward through-going muons in Super-Kamiokande," S. Desai *et al.* Phys. Rev. D70:083523, 2004, Desai was LRS's PhD student; this is his thesis work.

"High energy neutrino astronomy using upward-going muons in Super-Kamiokande-I," K. Abe *et al.* Astrophys. J.652:198, 2006.

"First results of the Instrumentation Line for the deep-sea ANTARES neutrino telescope," by ANTARES Collaboration (J.A. Aguilar *et al.*). Astropart. Phys.26:314-324, 2006. e-Print: astro-ph/0606229 (>35 cites)

"Search for Diffuse Astrophysical Neutrino Flux Using Ultrahigh Energy Upward-Going Muons in Super-Kamiokande I," By Super-Kamiokande Collaboration (Molly E.C. Swanson *et al.*). Jun 2006. 10pp. Astrophys. J.652:206-215,2006. e-Print: astro-ph/0606126

Muon g-2 Experiment - development of fast waveform digitizers and fiber calorimetry at BU for the SSC + excellent physics

"Precise measurement of the positive muon anomalous magnetic moment," Muon g-2 Collaboration (H.N. Brown *et al.*). Feb 2001. Phys.Rev.Lett.86:2227-2231,2001. e-Print: hep-ex/0102017 (587 cites)

Development of Novel Detectors and their Technologies

"Very Large Proportional Drift Chambers With High Spatial And Time Resolutions," D.C. Cheng, W.A. Kozanecki, R.L. Piccioni, C. Rubbia, L.R. Sulak, H.J. Weedon, J. Whittaker *In the Proceedings of International Conference on Instrumentation for High-Energy Physics, Frascati, Italy, 8-12 May 1973, pp 268-274.* (>30 cites)

"A Liquid-Scintillator Total Absorption Hadron Calorimeter for the Study of Neutrino Interactions," A.C. Benvenuti *et al.* Nucl.Instrum.Meth.125:447,1975. (>40 cites)

First demonstration of acoustic detection of particle showers, and its development

"Experimental Studies Of The Acoustic Signature Of Proton Beams Traversing Fluid Media," L. Sulak *et al.* Nucl.Instrum.Meth.161:203,1979. (>25 cites)

"Studies of a full-scale mechanical prototype line for the ANTARES neutrino telescope and tests of a prototype instrument for deep-sea acoustic measurements," M. Ageron *et al.* Nucl.Instrum.Meth.A581:695-708,2007.

Invention of wavelength shifting plates directly coupled to photomultipliers

"A Wave Shifter Light Collector For A Water Cherenkov Detector," R. Claus *et al.* Nucl.Instrum.Meth.A261:540-542, 1987. (>30 cites) (invented by LRS and Claus, his MS thesis student)

Complete development of Quartz - Fiber Cherenkov Calorimetry for Collider Detectors for GEM at SSC and CMS at LHC

"Beam test results from a fine-sampling quartz fiber calorimeter for electron, photon and hadron detection," N. Akchurin *et al.* Nucl. Instrum Meth.A399:202-226, 1997. (14 cites)

"Test beam results of CMS quartz fibre calorimeter prototype and simulation of response to high-energy hadron jets," N. Akchurin *et al.* Nucl.Instrum.Meth.A409:593-597,1998.

"Design, performance and calibration of the CMS forward calorimeter wedges," G. Bayatian *et al.* Eur.Phys.J.C53:139-166, 2008.

"CMS technical design report, volume II: Physics performance," by CMS Collaboration (G.L. Bayatian *et al.*). CERN-LHCC- J.Phys.G34:995-1579, 2007. (>360 cites)

The first observations of Neutral Currents

As lead analysis person of the first observations, concurrently with Gargamelle at CERN "Measurement of Rates for Muonless Deep Inelastic Neutrino and anti-neutrino Interactions," B. Aubert *et al.* Phys.Rev.Lett.32: 1457,1974. (>125 cites)

As co-spokesman and lead physicist in designing and building the world's largest drift chambers (4x4m) and calorimeter (100 T)

"Observation of Elastic Neutrino-Proton Scattering," D. Cline, A. Entenberg, W. Kozanecki, A.K. Mann, D.D. Reeder, C. Rubbia, J. Strait, L. Sulak, H.H. Williams, Phys.Rev.Lett.37:252-255,1976. (>140 cites)

"Observation of Elastic anti-neutrino - Proton Scattering," D. Cline, A. Entenberg, W. Kozanecki, A.K. Mann, D.D. Reeder, C. Rubbia, J. Strait, L. Sulak, H.H. Williams, Phys.Rev.Lett.37:648,1976. (>120 cites)

SELECTED SCIENTIFIC ADVISORY PANELS, EXPERIMENT SPOKESMANSHIPS, AND CONFERENCE ORGANIZATION

2012-present	US CMS Upgrade Steering Committee
2011-present	PAC Reviewer for CMS HCAL papers
2011-2013	Chairman, US/CMS/HCAL Collaboration Board
2011-2012	CMS co-organizer of 3 Production Readiness Reviews, CERN, for 1) Castor, 2) HCAL-HO, and 3) HCAL-HF
2011	Organizer, CMS HCAL Upgrade Workshop, Boston University
2010	NSF Educational Programs, Biennial review committee
2009	Rapporteur, Habilitation Committee for J. Brunner, "Neutrinos: From Oscillations to Astronomy," University of Marseille
2007	Review Board, NASA 5-Year Plan for Astrophysics Experiments
2002	Experts Panel on Physics in Next 10 Years, Canadian Foundation for Innovation. Funded expansion of SNO Laboratory
1998	Convener of Astrophysics Sessions, International Conference on High Energy Physics,
1997	Advisory committee, Int'l Workshop in Supernova Early Detection Network
1995-1996	Int'l Advisory Committee, Int'l Workshops on Proton Decay and Neutron-Antineutron Oscillations,
1994-1996	Technical Board, CMS Detector for the Large Hadron Collider (LHC) at CERN
1994-present	Collaboration Council of CMS
1994-1996	Spokesman, Forward (Quartz Fiber) Calorimetry Detector Group, CMS Collaboration, LHC, CERN
1994-1996	Co-Spokesman of the Forward Calorimeter, CMS
1993-1994	Ten Year Review Committee, French National Plan for Science and Education Policy
1993-1994	Program Advisory Committee, Dep't of Physics, Astrophysics and Instrumentation, Centre d'Etude, Saclay
1993-1995	Co-chairman, United Nations OECD Forum on Megascience, Commission on Astroparticle Physics
1990-1992	Int'l Advisory Committee, Theoretical and Phenomenological Aspects of Underground Physics
1988-1992	Co-Spokesman, TEXAS Detector for the Superconducting Super Collider
1987-1991	HEPAP member, U.S. Department of Energy High Energy Physics Advisory Panel
1984-1988	Scientific Program Committee, National Institute of Nuclear Physics, Italy, Gran Sasso National Laboratory
1984-1985	National Science Policy Committee, Interministerial Commission for Scientific Research, Spain
1984-1986	Executive Committee, Division of Particles and Fields, American Physical Society
1983	Natural Sciences & Engineering Research Council, Committee on New Canadian Projects in Particle Physics
1981	HEPAP subpanel on Long Range Planning, U.S. Department of Energy High Energy Physics Advisory Panel
1980-1982	Executive Committee, Division of Particles and Fields, American Physical Society,

FORMER STUDENTS now accomplished physicists (and their current affiliations)

Former undergraduate mentees: Prof. H. Baranger (Duke), Steve Biller (Oxford), Mark Bregman (VP, Symantec), Rob Cormac (MGH), Prof. George Gollin (Illinois), Prof. David Hanna (McGill), Michael Hedges (Hawaii), Prof. Kay Kinoshita (Kentucky), Harold Lessure (Carnegie-Mellon), Prof. Leonid Levin (Lausanne & PSI), Mike Levy (LBL), Prof. Peter Meyers (Princeton), Prof. Rene Ong (UCLA), Prof. Mark Robbins (Johns Hopkins), Dr. Lenny Rivkin (Zurich & Lausanne), Prof. Martin Rocek (Rockefeller), Prof. Marjorie Shapiro (former Physics Chair, Berkeley), Prof. Wesley Smith (Wisconsin, CMS Trigger Director), Prof. Alan Sokal (NYU), Prof. A. Strominger (Harvard)

Former PhD advisees and post-doctoral fellows: Dr. Richard Bionta (Lawrence Livermore Lab), Prof. Dave Casper (Irvine), Dr. Rick Claus (SLAC), Dr. Bruce Cortez (Lucent), Dr. Shantanu Desai (Penn State), Prof. Steve Dye (U. of Hawaii), Dr. Bill Foster (member of US Congress & former Fermilab Director of Research), Mark Greenberg, Prof. A. Heister (BU), Prof. Joe Incandella (UCSB, Spokesman of CMS), Prof. Soo-Bong Kim (Seoul National) Dr. Witold Kozanecki (SLAC & Saclay), Phil Lawson (Jaguar/Land Rover Labs), Dr. Richard Bionta (Lawrence Livermore Lab), Prof. Sally Seidel (New Mexico), Dr. Jim Strait (Accelerator Director, Fermilab), Kate Scholberg (Duke), Chris Walter (Duke)

Former graduate student mentees: Dr. Douglas Brown (KEK, Japan), Dr. Sandra Ciocio (Lawrence Berkeley Laboratory) Dr. Robert Cormac (Mass General Hospital Proton Therapy Facility), Fanny Dufour (University of Geneva), Prof. Chris Henley (Cornell), Sonia Karkar (University of Strasbourg), Prof. Charling Tao (Univ. Marseille)

Former undergrad mentees, now high school physics teachers: Barbara Kerosky Franks, Dan Welty

SELECTED REFERRED PAPERS PUBLISHED IN 2013 Papers where LRS played a significant role are listed below, all utilizing the Forward Cherenkov Calorimeter of CMS, invented by LRS initially for the SSC. These were selected from the 126 papers produced by the very large CMS authorship, and have been cited 2299 times as of 2/28/14, including 3 very well known (100-249), 5 well-known (50-99), and 64 known papers (10-49 cites)*.

Vector boson fusion channel of Higgs production, using, in part, tagging jets of the forward calorimeter

1) “Observation of a new boson with mass near 125 GeV in pp collisions at $s\sqrt{=7}$ and 8 TeV” CMS Collaboration (Serguei Chatrchyan et al.). Mar 19, 2013. 117 pp. Published in JHEP 1306 (2013) 081, e-Print: arXiv:1303.4571 [hep-ex] 76 cites

Missing Energy Signatures, using the hermiticity provided by the forward calorimeters

2) “Search for new physics in events with opposite-sign leptons, jets, and missing transverse energy in pp collisions at $s\sqrt{=7}$ TeV” CMS Collaboration (Serguei Chatrchyan et al.). Published in Phys.Lett. B718 (2013) 815-840, e-Print: arXiv:1206.3949 [hep-ex] 31 cites

3) “Search for a standard-model-like Higgs boson with a mass in the range 145 to 1000 GeV at the LHC” CMS Collaboration (Serguei Chatrchyan et al.). Mar 31, 2013. Published in Eur.Phys.J. C73 (2013) 2469, e-Print: arXiv:1304.0213 [hep-ex] 29 cites

4) “Studies of jet mass in dijet and W/Z + jet events” CMS Collaboration (Serguei Chatrchyan et al.). Mar 19, 2013. 49 pp. Published in JHEP 1305 (2013) 090, e-Print: arXiv:1303.4811 [hep-ex] 16 cites

5) “Search for pair-produced dijet resonances in four-jet final states in pp collisions at $s\sqrt{=7}$ TeV” CMS Collaboration (Serguei Chatrchyan et al.). Feb 3, 2013. 23 pp. Published in Phys.Rev.Lett. 110 (2013), e-Print: arXiv:1302.0531 [hep-ex] 19 cites

6) “Search for new physics in final states with a lepton and missing transverse energy in pp collisions at the LHC” CMS Collaboration (Serguei Chatrchyan et al.). Feb 12, 2013. 25 pp. Published in Phys.Rev. D87 (2013), e-Print: arXiv:1302.2812 [hep-ex] 7 cites

7) “Search for supersymmetry in pp collisions at $s\sqrt{=7}$ TeV in events with a single lepton, jets, and missing transverse momentum” CMS Collaboration (Serguei Chatrchyan et al.). 57 pp. Published in Eur.Phys.J. C73 (2013) 2404, e-Print: arXiv:1212.6428 [hep-ex], 12 cites

8) “Search for supersymmetry in events with photons and low missing transverse energy in pp collisions at $s\sqrt{=7}$ TeV” CMS Collaboration (Serguei Chatrchyan et al.). Published in Phys.Lett. B719 (2013), e-Print: arXiv:1210.2052 [hep-ex] 14 cites

9) “Search for new physics in events with photons, jets, and missing transverse energy in pp collisions at $s\sqrt{=7}$ 13 TeV” CMS Collaboration (Serguei Chatrchyan et al.). 49 pp. Published in JHEP 1303 (2013), e-Print: arXiv:1211.4784 [hep-ex], 14 cites

Studies of Jets, with major contributions from Phil Lawson, LRS’s graduate student

10) “Studies of jet mass in dijet and W/Z + jet events” CMS Collaboration (Serguei Chatrchyan et al.). Mar 19, 2013. 49 pp. Published in JHEP 1305 (2013) 090, e-Print: arXiv:1303.4811 [hep-ex] 16 cites

* Citation numbers are from the INSPIRE database of Stanford Linear Accelerator Center.