

Dr. Paul Weber

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SUMMARY An enthusiastic teacher, communicator and presenter of physics, and an experimentalist with many years experience in high energy physics research, thin films research, nanotechnology and grant writing and administration.

EDUCATION **Ph.D.**, Experimental Particle Physics, University of Colorado at Boulder, December 1990, thesis: "*Separated Vertex Search and Measurement of the B Hadron Lifetime in e^+e^- Annihilation at $\sqrt{s} = 29$ GeV.*"

M.S., Physics, University of Colorado at Boulder, December 1987.

B.S., *Magna Cum Laude*, Physics and Mathematics, Bemidji State University, Bemidji, Minnesota, February 1982.

SUMMARY

TEACHING ♦ Successful and innovative **physics teaching**, from introductory courses (including astronomy), through advanced undergraduate courses.
♦ **Mentoring students** in physics & research, and considering future career paths.
♦ **Development of new courses**, material and curriculum for teaching physics.

RESEARCH ♦ **Coordinating and directing research** involving undergraduate and graduate students and post-doctoral assistants.
♦ Grant writing and administration, as co-PI and as PI
♦ Experience **guiding analyses** from start to publication.
♦ **Thin films fabrication and characterization** using sputter coating, electroplating, ellipsometry and electron microscopy; planning and equipping a microfabrication laboratory and workshop.
♦ **Data analysis and publication in high energy physics**, including one of the most precise tau lifetime measurements ever made, and B meson lifetime measurements (including a first measurement of the B_s lifetime).

ADMINISTRATION ♦ Grant writing, and administration, as Principal Investigator (PI) and co-PI.
♦ **Supervising and coordinating particle detector operation**, training personnel, liaising with accelerator & machine operations, giving performance evaluations.
♦ **Organizing seminar series**, including locating and booking interesting speakers, arranging their visits to campus, and procuring funding.
♦ Excellent **writing, communications and interpersonal skills**.

SCHOLARSHIP ♦ **Delivering effective lectures and presentations and condensing information**, including seminars and conference reviews talks.
♦ **Writing of concise, informative publications** for refereed journals, including acting as **reviewer and referee** for submitted journal papers.
♦ Very experienced **giving understandable presentations** to in physics, and technology topics to the general public.

GRANTS, AWARDS and STUDENT PROJECTS

1. **NSF-ATE grant, \$703,940, May 26, 2017:** INTEGRATING ENVIRONMENTALLY IMPROVED PHOTOLITHOGRAPHY TECHNOLOGY AND VIRTUAL REALITY GAMES INTO ADVANCED NANOTECHNOLOGY EDUCATION, with professors Reza Kamali, Afsaneh Minaie, and Sean Tolman of the UVU Computer Engineering Department. I am the Principal Investigator (PI) for this grant, which is a 4-year award to develop a nanotechnology course and program for UVU. A pilot course will be taught in the Spring, 2020 semester as *Physics 2800*.
2. **Dean's Award for Excellence in Scholarship,** UVU College of Science, 2017 Convocation.
3. **Dean's Award for Excellence in Teaching,** UVU College of Science and Health, 2016 Convocation.
4. **Utah NASA Space Grant Consortium, \$5,920, July 2015,** for study of *Resistance of Thin Films*, with Alex Farnsworth (student), Dr. Samuel Tobler [Dixie State University] and Jacob Kodra (student). This was a joint project between two schools, DSU and UVU, culminating in a poster presentation at the UNSCG Scholars Conference at UVU on May 9, 2015.

These are grants received by students working directly under my supervision.

5. **URSCA Grant (\$2000) for Ammon Johnston,** Fall 2015, "*Creating Nanoscale Designs with the eSurface Plating Method.*" Ammon completed setting up of equipment, and first investigations at UVU of the eSurface electroless copper plating method for creating small scale circuit designs.
6. **URSCA Grant (\$2000) for Matt Stiles,** Spring 2016, "*Viability of Low Cost PM2.5 Monitors.*" Matt completed this study with four difference monitors and wrote up the result in a 15-page paper.
7. **URSCA Grant (\$2000) for Ammon Johnston,** Spring 2016, "*Nanolithography Using the eSurface Plating Method.*" Ammon produced the first successful runs using e-beam lithography to create patterns that were plate by the eSurface method.
8. **Teels Fellowship (\$4000) for Ammon Johnston,** Fall Semester 2016 and Spring 2017, "*Nanoscale Designs with the eSurface Plating Method.*" Ammon is now extending his studies in the creation of micron sized pattern using electron beam lithography to different materials, with the longer-term goal of designing small gas sensors with an antenna pattern and infrared lasers.
9. **Student Research Project,** Fall semester 2008 with UPS student Benjamin Ice, on hydrogen fuel cells. With the support of departmental funds, we designed a simple test apparatus for a proton-exchange membrane (PEM) fuel cell, and operated it in order to study efficiencies as a function of operating conditions.
10. **Student Research Project,** Fall 2006 – Spring semester 2007 with UPS physics major San Nguyen, on chaos studies with an instrumented double pendulum. With the support of departmental funds, we designed, machined and instrumented a double pendulum with dual rotary motion sensors for chaotic motion studies, searching for
11. **Student Research Project,** Spring semester 1996, with Grinnell College physics major Timothy Stiles, to carry out tau lepton lifetime measurements. Working with OPAL data remotely (from Iowa), Tim learned to run OPAL/CERN data analysis code, and contributed to updated analyses of the tau lepton lifetime, extracted from new data at the OPAL detector at CERN in Geneva, Switzerland. These results were refined and added to the updated tau lifetime measurement *Physics Letters B* **374** (1996) 341-350.

EXPERIENCE

UTAH VALLEY UNIVERSITY, PHYSICS DEPARTMENT

Orem, Utah

Assistant ProfessorAugust 2012 – June 2017

Associate ProfessorJuly 2017 – Present

Teaching introductory and upper division physics courses and laboratories, and improving teaching skills through seminar discussions with other teachers in engaged learning. Research activity on processes for achieving thin film coatings using RF sputtering, and applications in solar cell design, optical coatings and electrical conductivity studies. Service as member of Capitol Reef Field Station steering committee. Scholarly participation by delivering seminars at UVU and beyond. **Department Chairman:** Professor Philip Matheson.

- ⊙ Collaborated with faculty of the UVU electrical and computer engineering department to bring a successful **NSF GRANT AWARD TO PRODUCE AND TEACH A NANOTECHNOLOGY COURSE AT UVU**, including laboratories. The four-year grant award to UVU totals \$703,940, and I serve as the Principal Investigator (PI) for this award, which involves personnel and budget management responsibilities and reporting to NSF-ATE program, including annual conference presentations in Washington, DC.
- ⊙ **TAUGHT** courses in general physical science, calculus-based introductory physics, thermodynamics, electronics, modern physics, electricity and magnetism, and advanced physics laboratory. **CURRENTLY TEACH** restructured, two-semester modern physics course that is being integrated with laboratory courses under my coordination. Very strong SRI ratings of about 4.8 overall. Improved overall SRI ratings of electronics and advanced labs from about 2.5 average to 4.5.
- ⊙ Active participation in **TEACHING DEVELOPMENT** seminars including New Faculty Teaching Scholars (NFTS) in Fall 2012 and Teaching Academy in Fall 2013.
- ⊙ Research activity on sputtering and thin films. **AWARDED GRANT** from Utah NASA Space Grant Consortium, to carry out collaborative work with Dixie State University faculty Samuel Tobler and involving a UVU physics major, on characterizing resistivities of thin film metal coatings of nickel, copper and gold, for contract running from August 2015 through April 2016.
- ⊙ **RESEARCH COLLABORATION ON NEW METHOD FOR ELECTROLESS PLATING AND LITHOGRAPHY**, with Professor Kamali of UVU Computer Engineering Department, using the eSurface technology that has been licensed for research use exclusively to Utah Valley University. This is a new water-based technology that is far more environmentally than traditional methods relying on toxic developing solutions and acid etchants. **POSTER AND TALK PRESENTED** by UVU student Ephraim Nielson at IEEE Sustech Conference in July 31, 2015, “Sustainability in Printed Circuit Board Manufacturing.” Poster awarded first prize at conference.
- ⊙ Served as member of **CAPITOL REEF FIELD STATION STEERING COMMITTEE**. Active involvement in getting summer geology camp for high school teachers to base their two week course at the CRFS. Actively involved in planning for a new combination observatory and classroom addition to capitalize on the premium dark sky environment of Capitol Reef National Park.
- ⊙ Member of **UVU Faculty Senate representing the physics department**, from Fall 2016 through Spring 2019.
- ⊙ Chair of **UVU physics department RTP Committee**, from Fall 2019 onwards.
- ⊙ Served for two years as **FACULTY ADVISOR FOR UVU SOCIETY OF PHYSICS STUDENTS** club, by popular request of the students. Meet with students, assist in planning future events and in developing new activity ideas for weekly meetings.

- ⊙ **SUMMER PARTICIPATION** in professional enrichment activities, including presentation on integrated waves and modern physics course at AAPT 2013 Summer Meeting in Portland, OR and 3-day summer workshop on surface-enhanced Raman spectroscopy at Bethel University, Minnesota.
- ⊙ Periodic **SEMINARS GIVEN AT UVU** on thin film solar cell production, and the evolution of the UVU thin films laboratory, a project that has evolved into setting up a laboratory to combine sputtering capabilities for thin films with electron microscope and with photolithography equipment for teaching new nanotechnology course and expanding the capabilities for physics student research projects.

UNIVERSITY of PUGET SOUND, PHYSICS DEPARTMENT

Tacoma, Washington

Visiting Assistant Professor July 2011 – August 2012

Teaching introductory and upper division physics courses and laboratories. Continuing independent search for research activities to involve and engage students, and developing curriculum materials. **Department Chairman:** Professor Gregory S. Elliott.

- ⊙ **TAUGHT** courses in advanced electricity and magnetism for physics majors, university physics and laboratory sections. Supervised a student independent study course in thermodynamics. Received outstanding student evaluations in all courses taught.
- ⊙ **LED FRESHMAN SEMINAR COURSE**, for the physics department, that is part of the University's writing and rhetoric requirement for all entering freshmen. These formative courses (typically one from every department) are usually taught only by tenured faculty, as they form the first exposure of students to rigorous college level writing, research, and collaboration.
- ⊙ **REVISED AND EDITED MY MANUSCRIPT** on waves and oscillations, for the restructured modern physics course I taught previously at UPS. The revised edition (and lab manuals) were used in the modern physics course taught by Professor Elliott, and were used again by Professor Worland for the Fall 2012 class. Feedback indicates the materials provide a useful foundation for the study of modern physics, and that students sometimes find the homework problems challenging.
- ⊙ **COMMITTEE PARTICIPANT** that completed a grant proposal submitted to the Howard Hughes Medical Institute, for including sustainability science into the research and curriculum at UPS. My proposed contributions were inclusion of sustainability material and discussions in the freshman seminar on energy, and also the construction of a demonstration on the effectiveness of various gases as greenhouse agents that could be used in outreach activities.
- ⊙ **ACCURACY REVIEWER** for the textbook *"Modern Physics for Scientists and Engineers,"* by Stephen Thornton and Andrew Rex. I was paid to thoroughly review and check the second half of the text draft (including all the problems and their worked-out solutions) on statistical mechanics, nuclear and particle physics, and cosmology.

SELF EMPLOYMENT

Tucson, Arizona and Tacoma, Washington

Independent Work and Study July 2010 – June 2011

During this year I worked on independent projects and travel, as a hiatus from many years of teaching. I pursued volunteer and paid activities both in physics and in activities completely outside it.

- ⊙ Served as a paid reviewer and proofreader for the textbook *Modern Physics for Scientists and Engineers*, 4th ed., by Stephen Thornton and Andrew Rex (Cengage, 2013) including checking solutions of all problems in instructor's solutions manual.
- ⊙ Consultant and reviewer for the book *The Empathy Factor*, by Marie Miyashiro (Puddle Dancer Press, 2011. Website: <http://empathyfactoratwork.com/>), who operates a successful business consulting company in Tucson, Arizona.

- ⊙ Independent work included service in house remodel and repair work, and piano tuning. Many of these were pro bono work for people unable to afford contractors to do this work.
- ⊙ Constructed a personal web page for making materials prepared for modern physics and other courses available to a wide audience (<http://drpaulweber.org>).

UNIVERSITY of PUGET SOUND, PHYSICS DEPARTMENT

Tacoma, Washington

Visiting Assistant Professor August 2004 – June 2010

Teaching physics courses for upper level students and continuing investigations involving efficient energy use and sustainability. **Department Chairman:** Professor Gregory S. Elliott.

- ⊙ **TAUGHT** courses in university physics, classical mechanics and modern physics and their laboratories, and independent study class in thermal physics.
- ⊙ **REVISED MODERN PHYSICS COURSE**, merging previous waves course with two-semester modern physics sequence, into an integrated two-semester sequence that begins with oscillations, complex analysis, Fourier series, the classical wave equation and electromagnetic waves and then follows naturally into modern physics, starting with relativity. A significant advantage results from approaching quantum theory with a fluent background in waves. Revised, developed and enhanced laboratories for both semesters, including a seamless integration of essential topics in error analysis using auxiliary text by Bevington and Robinson.
- ⊙ **WROTE COURSE MATERIALS** for revised modern physics course, including a manuscript of my own notes for physics of oscillations and waves (185 pages), and lab manuals for both first and second semesters (about 70 pages each). All materials produced as LaTeX manuals.
- ⊙ Supervised research projects for undergraduates, on the double pendulum as a chaotic system (physics thesis) and PEM hydrogen fuel cells (honors thesis).
- ⊙ Appointed to Sustainability Advisory Committee at the University of Puget Sound, a group including many students that plans environmental sustainability awareness events and develops sustainable practices at the university and in the local community.

PIMA COMMUNITY COLLEGE

Tucson, Arizona

Adjunct Instructor in Mathematics January – July 2004

Part time teaching position at the Southeast Learning Center. **Immediate Supervisor:** Mr. Brian Nelson.

- ⊙ **TAUGHT** sections of *Intermediate Algebra* (MAT 122) and *Topics in College Mathematics* (MAT 142) to small classes of non-traditional students, and students challenged by mathematics. Received great evaluations from students, and saw significant increase in class size for MAT 142 after MAT 122 was taught, based on recommendations that were made to other students.

UNIVERSITY of ARIZONA,**DEPARTMENT of SYSTEMS and INDUSTRIAL ENGINEERING**

Tucson, Arizona

Graduate Teaching Assistant August - December 2002 (1 semester)

Studies in systems engineering combined with teaching a class in the engineering curriculum. **Department Chairman:** Professor Ronald G. Askin.

- ⊙ **TAUGHT** section of ENGR 102, *Introduction to Engineering*, a required first course for prospective majors in any field of engineering. Course emphasized key engineering philosophies such as design of experiments, and the design process. **SUPERVISED STUDENT TEAMS** as they completed three design projects through the semester, as well as completing class work.

- ⊙ **GRADUATE COURSEWORK** in linear programming, non-linear programming, control systems theory, and management of technology. Carried out, and assisted in direction of team projects on intelligent traffic design, and formulated novel solutions to variations of the traveling salesman problem using methods of linear programming.
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UTAH VALLEY STATE COLLEGE, DEPARTMENT of PHYSICS Orem, Utah
Assistant Professor of PhysicsAugust 2001 - August 2002 (1 year)

Taught physics courses and developed curriculum at a large state college in the process of starting a physics major. **Department Chairman:** Professor Phil Matheson.

- ⊙ **TAUGHT** introductory astronomy, introductory physics (calculus-based) and mathematical methods for physicists (first time this course was taught at this college).
- ⊙ Performed **CURRICULUM DEVELOPMENT** for a new course, *Experimental Physics I*, for majors in their sophomore/junior year. Selected experiments and assembled first draft of student guides, procured and ordered equipment, and tested experiments.
- ⊙ Appointed member of the **SCHOLARLY ACTIVITIES COMMITTEE**. Reviewed applications for release time and funding from science faculty members. Made recommendations on funding to the Dean of Science and also interacted with faculty members to strengthen and develop their applications.

WILLIAMS COLLEGE, DEPARTMENT of PHYSICS Williamstown, Massachusetts
Visiting Assistant Professor of PhysicsJuly 2000 - June 2001 (1 year)

Taught physics courses at a small, highly-selective liberal arts college dedicated to excellence of teaching and research. **Department Chairman:** Professor Kevin Jones.

- ⊙ **TAUGHT** sophomore-level introduction to electricity and magnetism (text: E. M. Purcell, *Electricity and Magnetism*, Berkeley Physics Course Volume 2) with labs, and second-semester general physics (text: D. C. Giancoli, *Physics*, 5th edition) with labs.
 - ⊙ Retained involvement with **PARTICLE PHYSICS RESEARCH** with the OPAL collaboration at the European Laboratory for Research in Particle Physics (CERN). Traveled to meeting, contributed to efforts on a new τ physics analysis.
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SYDA FOUNDATION South Fallsburg, New York
Audio-Live Sound Technical AssistantFebruary – May, 2000 (3 months)

Volunteer position at a large ashram community, in support of the many live events and gatherings held at the center. **Sound Department Head:** Bobby Froscher.

- ⊙ **MIXED SOUND** for live programs on 16- and 48-channel mixing boards, in collaboration with musicians expert in Indian instrumental music and chanting.
 - ⊙ **DIAGNOSED, TESTED AND REPAIRED** audio department sound modules.
 - ⊙ Assisted in installing and debugging sound reinforcement equipment in various acoustical settings.
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GRINNELL COLLEGE PHYSICS DEPARTMENT Grinnell, Iowa
Visiting Assistant Professor of PhysicsAugust 1996 - June 1999 (3 years)

Taught introductory and upper division physics courses at a small, highly-selective liberal arts college dedicated to excellence of teaching. About 60% of the majors eventually continued on to graduate school. **Then Department Chairman:** Professor Robert Cadmus. [Current: Professor Cunningham]

- ⊙ **TAUGHT** introductory astronomy, calculus-based general physics in both workshop and lecture/laboratory formats, classical mechanics, electromagnetic theory, and thermodynamics/statistical mechanics. **SUPERVISED GUIDED READINGS** for students in particle physics and advanced topics in basic astronomy. **SUPERVISED** student laboratory assistants for introductory physics.
- ⊙ **COORDINATED WEEKLY PHYSICS SEMINAR SERIES** for two years. Located interesting speakers from Iowa region and beyond from academia and industry. Solicited and obtained funding through both on-campus and external sources. Arranged campus visits, and followed up with letters of thanks and travel reimbursement.
- ⊙ Continued involvement with **PARTICLE PHYSICS RESEARCH** through giving conference presentations, and carried on research with the OPAL collaboration (through an association with Carleton University) together with a Grinnell physics major (Tim Stiles).

CARLETON UNIVERSITY PHYSICS DEPARTMENT

Ottawa, Canada

Postdoctoral Research AssociateOctober 1990 - December 1995 (5 years)

Carried out physics analyses, was site representative for Carleton-built vertex chamber, and carried out run coordination duties for the OPAL (Omni-Purpose Apparatus for LEP) experiment at LEP (Large Electron-Positron Collider), at the European Laboratory for Particle Physics (CERN) near Geneva, Switzerland. Resident at CERN, June 1991 – Dec. 1995. **Supervisor:** Professor Robert K. Carnegie.

- ⊙ **DIRECTED AND ASSISTED PHYSICS ANALYSIS WORK**, including precise measurements of the **TAU LEPTON LIFETIME** (principal author, the most precise single determination at that time); and the **B_s^0 MESON LIFE-TIME** (first measurement); and detailed studies of **BEAM-RELATED RADIATION BACKGROUNDS** in the OPAL detector.
- ⊙ **SUPERVISED** students and post-doctoral researchers in research projects. Served on **EDITORIAL BOARDS** for internal, pre-publication review of many OPAL analyses, providing extensive **CRITICAL REVIEW** of analysis methods and paper drafts. **DELIVERED PRESENTATIONS** both for OPAL-specific work and general summary talks at conferences, universities and laboratories in the USA and Europe. Wrote concise, thorough and easily-usable **DOCUMENTATION** for analysis and detector projects.
- ⊙ **OPERATED AND MAINTAINED** the high-voltage system for the OPAL vertex drift chamber, serving as the CERN-resident expert and coordinator. Performed regular shift duties for OPAL as a **SHIFT TEAM LEADER**. Served two ten-day intervals as **OPAL DEPUTY RUN COORDINATOR**, assuming primary responsibility for maintaining overall detector performance and resolving operational problems, and leading run coordination meetings.

UNIVERSITY OF COLORADO PHYSICS DEPARTMENT

Boulder, Colorado

Graduate Research AssistantSeptember 1983 - September 1999 (7 years)

Charged-particle detector development, construction, installation, and operation; research on topics in b-quark physics leading to the completion of Ph.D. thesis, 14 September 1990, **under the direction of** Professor William T. Ford. Title: *Separated Vertex Search and Measurement of the Average B Hadron Lifetime with the MARKII Detector at PEP*. Resident at the Stanford Linear Accelerator Center (SLAC) from June 1985 through June 1990.

- ⊙ **COMPLETED PHYSICS ANALYSES** involving new techniques to select data samples enriched in b-quark events by exploiting information from high-precision particle tracking detectors. Performed the **FIRST APPLICATION OF A SEPARATED-VERTEX SELECTION** on the MARKII

detector data set collected at PEP (Positron-Electron Project), to obtain a b-quark enriched sample that was used to measure the B hadron lifetime. Carried out **FIRST STUDIES OF IMPACT PARAMETER TAGGING METHOD** to select b-enriched samples in MARKII SLC (SLAC Linear Collider) data, later used extensively by experiments on the LEP ring at CERN.

- ⊙ **DEVELOPED AND CONSTRUCTED** high-precision tracking detectors. Participated in the construction, software development and data analysis for the **TRIGGER PROPORTIONAL TUBE CHAMBER** used in the MARKII PEP Upgrade run (1985-86). Designed calibration system, performed engineering quality control analyses, and tested and installed FADC (Flash ADC) readout system for the MARK II **DRIFT CHAMBER VERTEX DETECTOR** used during running of the detector at the SLC.
- ⊙ **PUBLIC RELATIONS AND TEACHING EXPERIENCE** serving as a SLAC tour guide. Lectured to, guided, and answered questions from a great variety of groups spanning the entire range of age and scientific background. Developed various forms of tour presentations, including assembly of multimedia materials.

UNIVERSITY OF COLORADO PHYSICS DEPARTMENT

Boulder, Colorado

Graduate Teaching AssistantSeptember 1982 - September 1983 (1 year)

Assisted in teaching both pre-med and calculus-based general physics courses. **Supervisors:** Albert A. Bartlett and Joseph Dreitlein.

- ⊙ **CONDUCTED RECITATION SECTIONS** and proctored and marked exams. **SUPERVISED LAB SESSIONS** for pre-med general physics. **TUTORED STUDENTS**, both as part of duties associated with the appointment and at the request of students after receiving the Graduate Research Assistantship.
- ⊙ Served as **GRADUATE COMMITTEE STUDENT REPRESENTATIVE**, February 1983 through May 1985. Involved arbitration for grievances, and review of applications for admission to graduate study in physics.

OTHER EXPERIENCE and SKILLS

Leadership and organization experiences

- ◆ **Mentoring and guiding students.** I have advised, mentored and tutored many students over decades of academic life from my undergraduate years to the present, including the years at CERN. I have been the academic advisor for students at UVU, and also for students at the University of Puget Sound and Grinnell College.
- ◆ **Organized, trained and coached running teams** for the OPAL Collaboration (350 physicists plus support staff) for the annual CERN Relays. Directed weekly track practices, solicited participation, and grouped runners into six-person teams, fielding typically five teams each year. During three years of coaching, the top OPAL men's team finished second in the first year, then won the overall title both of the following years. The event was open to CERN affiliates and to any interested runners in the Geneva area (typical participation was 50 teams).
- ◆ **Organized, planned logistics and procured equipment** for hiking trips, including an ascent of Mt. Shasta with eight people, and two-day hike of the John Muir trail with four people, and several hikes to Mt. Timpanogos and Mt. Nebo.

Broad Interests

- ◆ **Physical fitness** An active runner who has run 12 marathons across the USA and Europe (PR: 2:42:53 in 1989), and active in sports including freestyle cross country skiing, hiking and backpacking, golf and weight training.
 - ◆ **Music** I continue to study and play classical piano, as I have since my youth. I studied pipe organ through graduate school, including playing for many church services, weddings, and giving recitals. I have tuned and repaired pianos as a side job in high school and college. And I have been active in sound and audio reinforcement, including mixing sound for public events and musical events on 48-channel mixing boards.
 - ◆ **Travel** experience includes visits to all the countries of Western Europe, Canada, South Korea, and India. I worked, and resided in Ottawa, Canada for 9 months and in France, near Geneva, Switzerland for 4½ years while I was a postdoc at CERN. I have visited 49 of 50 US states, and resided for at least three months in Minnesota, Illinois, Iowa, Massachusetts, Colorado, California, Arizona, Washington and Utah.
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PRESENTATIONS

The **seminars** and **colloquia** listed below were one hour presentations.

- ➔ “*Searching for the Higgs Boson at the Large Hadron Collider*,” **colloquium** at University of Puget Sound, April 2005.
- ➔ “*What is a Higgs particle, and Where Can You Find One?*” **colloquium** at Earlham College, Richmond, Indiana on April 10, 2003.
- ➔ “*What is a τ Particle?*” invited **colloquium** at the University of Southern Colorado, Pueblo, Colorado on March 13, 1997.
- ➔ “*The Little Neutral One - Neutrinos, Past and Present*,” **seminar** at Grinnell College, April 2, 1997.
- ➔ “*Review of τ Lifetime Measurements*,” **review talk**, 4th International Workshop on τ Lepton Physics, Estes Park, Colorado, 16-19 September 1996.
- ➔ “*Updated OPAL τ Lifetime Measurement*,” **conference presentation**, 1996 Meeting of the American Physical Society Division of Particles and Fields, Minneapolis, Minnesota, August 1996.
- ➔ “*Updated Tests of Charged-Current Universality with the OPAL Detector at LEP*,” **seminar** at the Stanford Linear Accelerator Center, 2 April 1996.
- ➔ “*Testing Tau Universality with the OPAL Detector at LEP*,” **seminar** talk presented Duke University, Augsburg College, California Institute of Technology, TRIUMF, and the University of Victoria in November 1995.
- ➔ “*Measurements of the τ Lepton Lifetime*,” **review talk** at the 6th International Symposium on Heavy Flavor Physics, Pisa, Italy, 6-10 June 1995.
- ➔ “*Review of τ Physics after the Montreux Conference*,” **colloquium** at the Deutsches Elektronen Synchrotron Laboratory (DESY), Hamburg, Germany, 6 December 1994.
- ➔ “*Recent τ Physics Results from the OPAL Experiment*,” **conference presentation** at the 1994 Meeting of the American Physical Society Division of Particles and Fields, Albuquerque, New Mexico, 2-6 August 1994.

- ➔ “Checks of τ Lepton Charged-Current Universality with the OPAL Detector,” **seminar** presentation given at the Universities of Michigan, Minnesota, Montreal, and the Stanford Linear Accelerator Center, December 1993.
- ➔ “Measurements of the τ Lepton Lifetime,” **review talk** at the International Europhysics Conference on High Energy Physics, Marseilles, France, 22-28 July 1993.

PUBLICATIONS

PRINCIPAL AUTHOR

1. R. Kamali-Sarvestani, P. Weber, M. Clayton, M. Meyers and S. Slade, “Applications of Virtual Reality to Improve Nanotechnology Education,” submitted to IEEE Nanotechnology, Dec. 4, 2019.
2. R. Kamali-Sarvestani, E. Nielsen, P. Weber and A. Johnston, “Application of Auto-Catalytic Metalization as a Sustainable Technique for Planar Inductor Fabrication,” submitted to and accepted by IEEE SustainTech 2016, Phoenix, AZ (October 9 – 11, 2016).
3. R. Kamali-Sarvestani, E. Nielsen and P. Weber, “Sustainability in Printed Circuit Board Manufacturing,” presented at IEEE SustainTech, Ogden, UT (July 30 – August 1, 2015).
4. P. Weber, “Oscillations and Waves: An Introduction for Modern Physics,” (2009, revised edition 2011) a 190-page manuscript written in LaTeX based on course materials, worked examples and homework problems I prepared for a revised version of the modern physics sequence taught at the University of Puget Sound.
5. P. Weber, “Review of τ Lifetime and Leptonic Branching Ratio Measurements,” invited presentation at the 4th International Workshop on τ Lepton Physics, Estes Park, Colorado, 16-19 September 1996, Nuclear Physics B **55C** (1997) 107-119.
6. P. Weber, “Improved Measurement of the τ Lifetime from the OPAL Collaboration,” Proceedings of the American Physical Society Division of Particles and Fields Meeting, Minneapolis, Minnesota, 10-15 August 1996. Published by World Scientific.
7. P. Weber, “Measurements of the τ Lepton Lifetime,” invited presentation at the 6th International Symposium on Heavy Flavor Physics, Pisa, Italy, 6-10 June 1995. Il Nuovo Cimento **109A** (1996) 925-938.
8. G. Alexander *et al.* (OPAL Collaboration), “Improved Measurement of Lifetime of the τ Lepton,” Physics Letters **B374** (1996) 341-350.
9. P. Weber, “A Limit on the τ Neutrino Mass, and Measurement of the τ Leptonic Branching Ratios and Lifetime from OPAL,” Proceedings of the 8th Meeting of the Division of Particles and Fields, University of New Mexico, Albuquerque, New Mexico, 2-6 August 1994 (World Scientific, 1995), 649-654.
10. P. Weber, “Measurements of the τ Lepton Lifetime,” Proceedings of the International Europhysics Conference on High Energy Physics, Marseilles, France, 22-28 July 1993 (Editions Frontiers, 1994), 479-480.
11. P. D. Acton *et al.* (OPAL Collaboration), “Measurement of the τ Lifetime,” Zeitschrift für Physik **C59** (1993) 183-194.
12. P. D. Acton *et al.* (OPAL Collaboration), “Measurement of the B^0_s Lifetime,” Physics Letters **B312** (1993) 501-510.

13. P. Weber, “*Tau Lifetime Measurement using the OPAL Detector at LEP*,” Proceedings of the 2nd International Workshop on τ Lepton Physics, The Ohio State University, Columbus, Ohio, 8-11 September 1992 (World Scientific, 1993), 270-281.
14. P. Weber, “*Separated Vertex Search and Measurement of the B Hadron Lifetime in e^+e^- Annihilation at $\sqrt{s}=29\text{ GeV}$* ,” Ph.D. Thesis, University of Colorado, UMI-91-22657 (1990). 133 p.
15. P. Weber, “*Vertex Tagging of b-Quark Events and Measurement of the Z^0 Branching Fraction to b Quarks*,” Proceedings of the 3rd MARKII Workshop on SLC Physics, SLAC-Report-315, July 1987, 473-482.
16. G. von Holtey *et al.*, “*Study of Beam-Induced Particle Backgrounds at the LEP Detectors*,” Nuclear Instruments and Methods **A403** (1998) 205-246.

CONTRIBUTING AUTHOR

17. P. D. Acton *et al.* (OPAL Collaboration), “*Measurement of the Tau Lepton Lifetime*,” Physics Letters **B273** (1991) 355-366.
18. D. Durrett *et al.*, “*Calibration and Performance of the MARKII Drift Chamber Vertex Detector*,” Proceedings of the 5th International Conference on Instrumentation for Colliding Beam Physics, Novosibirsk, USSR, 15-21 March 1990.
19. J. P. Alexander *et al.*, “*The MARKII Vertex Drift Chamber*,” Nuclear Instruments and Methods **A283** (1989) 519-527.
20. W. T. Ford *et al.*, “*Trigger Drift Chamber for the Upgraded MARKII Detector at PEP*,” Nuclear Instruments and Methods **A255** (1987) 486-495.

ASSOCIATED AUTHOR

My name is included in the author list of an additional 151 papers of the OPAL and MARKII Collaborations. While I served as an active participant on the internal-review editorial boards for many of these publications, I had no direct involvement in performing the analyses. The full list of these papers is available on request.