

RALPH H. PAGE

18829 Sandy Road
Castro Valley, California 94546

Home: 510.728.4336
RalphPage100@gmail.com

CAREER SUMMARY

Experimental Scientist with a significant record of publications and patents, and an in-depth knowledge of atomic, molecular, and optical physics, fiber optics, and nonlinear optics. Recognized expert in laser science and spectroscopy; also knowledgeable about condensed-matter physics, chemistry, and electronics. Proficient in designing, executing, analyzing, and publishing results of physics experiments. At ease with many kinds of laboratory equipment (especially lasers, optics, and electronics.) Qualified to handle chemicals and to work in a machine shop. Demonstrated ability to assemble and present funding proposals. Able to debug and adapt computer programs (e.g. Excel, Igor, Origin, IDL, TK Solver.) Comfortable working with undergraduate and graduate students, members of the academic community, R&D labs, management, and manufacturing-line personnel. Life-long learner and hands-on problem solver who welcomes scientific challenges and chances to solve technical problems, especially those associated with “tabletop experiments.”

PROFESSIONAL EXPERIENCE

UNIVERSITY OF CALIFORNIA Berkeley, California **2016 - present**

Consultant to Landry Group, Department of Chemical and Biochemical Engineering

- Assisted with selection of ultrafast lasers for biomolecular-sensor experiments
- Educated group members about aspects of multiphoton microscopy, fluorophores, and tissue optics
- Shared expertise regarding optical components, microscope optics, and laser-based light sources
- Familiar with linear and nonlinear spectroscopy of single-walled carbon nanotubes (SWNTs)
- Led experiment to demonstrate two-photon imaging using SWNTs in turbid media; manuscript in press

UNIVERSITY OF CALIFORNIA Berkeley, California **2014 - 2016**

Consultant to Pines Group, Department of Chemistry

- Provided laser, electronics, and optics support for optically-detected magnetic-resonance experiments
- Participated in discussions regarding feasibility of experiments, and future projects
- Performed spectroscopic characterization of diamonds containing NV centers and other defects
- Gave advice on optical-system design, and detector selection for improving the signal-to-noise ratio

SANDIA STAFFING ALLIANCE, LLC Albuquerque, New Mexico **2011 - 2014**

Contractor to Sandia National Laboratory, Livermore, California

- Laser development and atomic/molecular/optical physics work associated with national-security projects
- Plastic-host scintillator development and testing; scintillator photophysics modeling
- Acquired expertise in radiation detection. US patent granted, relevant to particle-discrimination problem.
- Troubleshooting of electro-optical systems for nuclear-weapon detonation-monitor field tests

UNIVERSITY OF CALIFORNIA Berkeley, California **2010 - 2012**

Consultant to Saykally Group, Department of Chemistry

- Provided laser, electronics, and optics support for high-resolution molecular-spectroscopy experiments
- Participated in discussions regarding feasibility of experiments, and future projects
- Retrofitted high-resolution THz-regime molecular-beam spectrometer with frequency-multiplier light source
- Acquired Saykally-group “tribal knowledge” and working knowledge of Quasi-optical Systems
- Coordinated collaboration with Siegel group (Jet Propulsion Laboratory) to obtain spectra of water clusters
- Gave group-meeting presentations on optical-system design, and considerations to achieve high signal-to-noise ratio
- Mentored graduate students

CALIFORNIA INSTITUTE OF TECHNOLOGY Pasadena, California **2010 - 2011**
Consultant to Okumura Group, Department of Chemistry

- Provided laser, electronics, and optics support for high-resolution molecular-spectroscopy experiments
- Aligned Cavity-Ringdown-Spectroscopy (CRDS) experiment studying peroxy radicals
- Mentored graduate students

CARL ZEISS MEDITEC, INC., Dublin, California **2008 - 2010**
Staff Systems Engineer

- Mastered OCT (Optical Coherence Tomography) principles, both spectral- and temporal-domain
- Participated in discussions regarding the tradeoffs, cost minimization, and performance optimization of next-generation OCT machines for ophthalmology
- Engaged in problem-solving, root-cause analyses, etc. to improve manufacturing yield
- Executed engineering changes and processed paperwork associated with FDA-approved medical-device design
- Corrected the field-service alignment protocol for the high visibility “Cirrus” OCT product
- Revised manufacturing process instructions for “Cirrus” OCT equipment
- Coordinated and spearheaded experiments to investigate “Cirrus” OCT-equipment alignment problems

LAWRENCE LIVERMORE LABORATORY, Livermore, California **2002 - 2008**
Physicist, National Ignition Facility

(“Matrixed” from V-division, Physical Sciences Department)

- Assembled and demonstrated a chromatic-dispersion-measuring system to be used in commissioning ARC (Advanced Radiographic Capability—NIF X-ray backlighter;) CLEO 2008 presentation
- Characterized spectrum of OPCPA (optical parametric chirped-pulse amplifier) - based short-pulse laser facility; increased 4-pass Nd:glass rod amplifier output above 5 Joule per pulse

Physicist, Shock-Physics Group (V-division) **2004 - 2007**

- Designed and led high-fluence experiments probing color-filter nonlinearities in the high-bandwidth NIF-beamline “Drive Diagnostics” (power monitors) used to balance the powers of 192 beams
- Diagnosed atomic-physics origin of Drive Diagnostic color-filter nonlinearity; successfully mitigated
- Designed “table-top” laser-shock/ablation experiments in 1 Mbar regime around tens-of-Joule, nanosecond-pulse lasers, incorporating time-resolved optical diagnostics
- Participated in ICF (Inertial Confinement Fusion) - related experiments (e.g. Rayleigh-Taylor instability) using laser-driven shocks at LLE (“Omega;” Rochester, New York)
- Familiar with X-ray (and other) diagnostics used at large laser facilities
- Refined code used to analyze LLE DANTE data, and provided time-resolved radiation (hohlraum) temperatures needed to assess drive conditions
- Conducted EOS (Equation of State) experiments at LLE (Omega;) obtained pioneering high-pressure EOS results (around 10 – 15 Mbar) on nanoporous copper foam

Physicist, Special Assignments Group/Physics and Advanced Technologies **2002 - 2004**

- Demonstrated and modeled first multimode-diode-pumped alkali-vapor laser (DPAL) that increased radiance by a factor ~ 2000 (i.e., ratio of output to pump brightness;)
- Identified and estimated severity of several atomic-collision-induced DPAL performance-degrading phenomena (e.g., energy pooling, Penning ionization)
- Outlined experiments to diagnose phenomena limiting DPAL power scaling
- Performed study on optical phase conjugation in broad-area multimode diode lasers
- Conducted feasibility study on optical gain in silicon-nanocluster-doped silica

Physicist, I-Division/ Physics and Advanced Technologies

2002

- Modeled the atomic and optical physics of Pu laser isotope separation; presented results to DOE-mandated external review committee
- Performed detailed spectroscopic analysis to verify similarity of liquid- and glassy-host Nd³⁺ gain media; this facilitated liquid-laser design
- Demonstrated first CW flowing-liquid-host Nd³⁺ laser (flow facilitates heat removal, stabilizes the thermal lens, and increases output power;); presented at OSA meeting

AGILENT TECHNOLOGIES LABORATORIES, Palo Alto, California

2000 - 2001

Hardware Design Engineer

- Tested electrostatically-tuned MEMs-VCSELs (micro-electro-mechanical vertical-cavity surface-emitting lasers) and developed wavelength-locker control loop
- Supervised EE summer intern (from UC Berkeley) building multiple-bounce reflectometer for testing high-reflector mirrors made in-house

LAWRENCE LIVERMORE LAB, Livermore, California

1989 - 2000

Physicist, Laser Program (Inertial Confinement Fusion)

1993 - 2000

- Demonstrated new solid-state laser and gain media (especially Cr²⁺ - doped II-VI compounds - “the Ti:sapphire of the mid-IR”)
- Characterized/developed laser glasses (including LG-770 and LHG-8) for the National Ignition Facility
- Served on CLEO program committee for solid-state lasers
- Introduced high-resolution, high-power fiber lasers to LLNL (DFB oscillators and cladding-pumped amplifiers;) these are used on NIF and on laser guidestar
- Modeled performance of high-average-power diode-pumped lasers, waveguide arrays, and upconversion phosphors
- Trained graduate students doing thesis research in solid-state-laser-materials development

Physicist, Laser Program (Atomic Vapor Laser Isotope Separation)

1989 - 1993

- Acquired broad knowledge of atomic-vapor laser isotope separation
- Participated in large-scale enrichment runs and conducted experiments on isotope-separation-process physics
- Helped design, model, modify, test, operate, and maintain kW-class high-repetition-rate dye-laser systems used for isotope-separation and adaptive-optics (sodium guidestar) experiments
- Modified refractory-metal-atom-beam source and performed ultra-high-resolution spectroscopy
- Discovered (and patented) sensitive resonance-ionization pathways in Zirconium
- Supported wavelength metrology/control group and improved reliability of laser wavelength settings

IBM ALMADEN RESEARCH CENTER, San Jose, California

1987 - 1989

Visiting Scientist

- Researched the use of plasma spectroscopy for monitoring and controlling RF sputter discharges producing thin magnetic films (e.g. Permalloy) for the magnetic-recording industry
- Investigated new polymeric electro-optic (nonlinear-optical) materials
- Elucidated relaxation dynamics in poled-polymer (electro-optic) thin-film waveguides
- Demonstrated metal-cluster (Cu₂) laser-induced-fluorescence spectroscopy using simple RF sputter source
- Determined accurate ionization potentials of sputtered transition-metal atoms using fluorescence-dip spectroscopy

UC BERKELEY PHYSICS AND CHEMISTRY DEPARTMENTS, Berkeley, California**1980 - 1987*****Research Assistant***

- Performed experiments using customized apparatus including molecular beams, lasers, optical parametric oscillators, vacuum systems, and mass spectrometers
- Applied nonlinear-optical techniques and nonlinear spectroscopy to study chemical physics of jet-cooled molecules and clusters
- Constructed LiNbO₃ optical parametric oscillator and used it to obtain IR spectra of water clusters
- Obtained high-resolution benzene-overtone spectra that challenged prevailing understanding of IVR
- Assembled frequency-tripling apparatus (using pulsed valve) for XUV spectroscopy
- Interpreted and assigned several molecular spectra

WATKINS-JOHNSON CO., Palo Alto, California**1978 – 1979*****Member of Technical Staff, Traveling Wave Tube R & D Section***

- Developed traveling-wave tubes, gain equalizers, and frequency-memory loops

SECURITY CLEARANCE

Recently held Department of Energy (DOE) “Q” clearance (until end of Sandia staffing Alliance contract)

RADIO LICENSES

Federal Communications Commission (FCC) amateur Extra class and commercial radiotelephone, with ship radar endorsement

EDUCATION

Ph.D. in Physics, University of California at Berkeley

Thesis title: "Nonlinear-Spectroscopic Studies of Highly Excited States of Molecules in Supersonic Beams"

Advisors: Professors Y. R. Shen (Physics) and Y. T. Lee (Chemistry)

Honors: U. C. Regents Fellow

B. S. in Physics, with honors, California Institute of Technology; minor in Electrical Engineering

Honors: National Merit Scholar; member of Tau Beta Pi