

## Lawrence R. Siegel

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### Qualifications:

- 13+ years of optical engineering, with expertise in electro-optics, lasers, and optical systems design.
- Design of IR, visible, and UV optical systems using CODEV, ZEMAX, and other CAD software.
- Extensive work on Dept. of Energy, DoD, and aerospace projects; security clearances held.
- MIT graduate student, receiving Master's degrees in Aero/Astro and public policy in 2002.
- Project manager experience with responsibility for staff, budget, proposal writing, and client presentations.

### Education:

Currently a candidate for dual Master's degrees from MIT:

- S.M., Aeronautics & Astronautics, Massachusetts Institute of Technology, June 2002
- S.M., Technology & Policy Program, Massachusetts Institute of Technology, June 2002

Graduate of Caltech/Wesleyan joint program in engineering & liberal arts:

- B.Sc., California Institute of Technology (Caltech), June 1986
- B.A., Wesleyan University (Middletown, CT), June 1986

### Career

#### **Summary: Graduate Student and Research Assistant**

(9/99 - date)

#### **Massachusetts Institute of Technology (MIT)**

Graduate work at MIT School of Engineering in the Aeronautics/Astronautics Department and the Technology & Policy Program. Coursework in systems design and engineering, with emphasis on the analysis of complex systems. Interdisciplinary program (TPP) that integrates engineering studies with policy analysis. Work includes:

- Coursework in systems modeling, statistics, optimization, numerical simulation, and cost-benefit analysis. Modeling and simulation using Excel, Matlab, and other CAD software
- Interdisciplinary studies in economics, finance, decision theory, risk assessment, budget evaluation, and managerial accounting.
- Graduate research assistantship award from Lean Aerospace Initiative (LAI). Research on strategic planning, assessment and use of intellectual capital in the U.S. aerospace industry.

(8/97 - date)

#### **Consultant**

#### **Lawrence R. Siegel -- Engineering Consulting**

Independent consultant supporting clients with optical design and optical engineering services. Design work for commercial clients, defense applications, and Dept. of Energy (DoE) laser projects at Lawrence Livermore National Labs (LLNL).

Work includes:

- Engineering work on the National Ignition Facility (NIF), a large-scale laser fusion project slated for completion by 2008 at a cost of \$3.5 billion.
- Design and analysis work in support of the NIF Final Optics Assemblies, which focus the beams onto the target.
- Optical modeling, feasibility and trade-off studies, analysis of tolerances for fabrication and assembly of optical hardware using CodeV and Zemax software.

(2/92 - 7/97)

#### **Senior Staff Electro-Optical Engineer**

#### **OPTICS 1, Inc., Westlake Village, CA**

Engineering and management responsibilities at a small firm (~\$2M/yr.) providing design services to the aerospace industry and commercial clients. Senior staff engineer and program manager with responsibility for design, project technical management, schedule, budget, client presentations, and staff

management. Supervision of small project teams through design and hardware phases, including prototyping, fabrication, product delivery and support. Design and analysis of optical systems in the visible, UV, and IR using CodeV software. Cradle-to-grave responsibilities including design, analysis, tolerancing, generation of fabrication drawings, source selection, coordination with vendors, system assembly, alignment, and acceptance testing. Work includes:

- Design of systems for research, commercial, industrial, aerospace, medical, and defense-related applications.
- Projects include helmet-mounted displays, optics for night vision devices, visual and photographic optics, FLIR and IR seeker systems, IR simulators, medical optics, microscopes, projection systems, optical data storage systems, Fourier optics and optical correlators, reflective optics, and spectrometer design.
- System and component design of the NIRSPEC spectrometer for the Keck II telescope (Mauna Kea, Hawaii) including design of an f/2.8 three mirror anastigmatic telescope.
- Proposal author, program manager, and principal designer for SBIR programs, including IR simulator development for testing of MWIR & LWIR sensors at Edwards AFB.
- Design and analysis of optics in high-power laser systems for Department of Energy programs.
- Design of low distortion wide-angle lenses for holographic recording at MIT Media Labs.
- Design and fabrication of prototype hardware, including security systems, LCD-based products, and other commercial products.
- Research and development efforts on replication techniques for the CVD of IR optical materials, and the development of conformal domes and windows in the IR.

(9/88 - 2/92) **Aura Systems, Inc., El Segundo, CA**

Staff electro-optical engineer at small aerospace firm (~150 staff). Responsible for optical design and analysis, opto-mechanical design, assembly, alignment and laboratory work involving IR systems. Design of optical and opto-mechanical components, system alignment, test, and calibration. Stress and vibration analysis, drafting of machining drawings. Projects include:

- Member of design team and systems engineer for the Infrared Scene Projector at the KHILS/SDI facility, Eglin AFB, FL. Experience with IR laser systems; responsible engineer for laser sources used in the IR Scene Projector. Systems engineering responsibilities, coordination of vendors and subcontractors. Hands-on assembly and alignment of complex optical system (>120 optical elements).
- Lead engineer for SBIR Phase II grants for projector technologies. Design and assembly of visible and HeNe-based projector systems. Investigated issues of surface roughness and scattering in IR materials, non-linear optics, and the frequency doubling of IR lasers.

(5/88 - 8/88) **Mars Observer Camera Project, Caltech, Pasadena, CA**

Mars probe for NASA/JPL mission launched in 1992. Assisted in design of test bed used for optical alignment and performance testing of wide-field and narrow-field camera assemblies. Use of CAD systems to design and generate drawings for fabrication of opto-mechanical mounts.

(10/86 - 1/88) **Pacific-Sierra Research Corp., Los Angeles, CA**

Research analyst responsible for the design and development of defense-related electro-optical systems. Laboratory construction and testing of prototype optical systems. Work involving scanning systems, application of liquid crystals as optical shutters, the effect of atmospheric turbulence on laser propagation, phase retrieval, EO and IR counter-measures.

(6/84 - 8/84) **Brookhaven National Labs, Brookhaven, NY.**

Summer internship at Department of Energy National Lab, supporting the Tandem Van de Graaff Particle Accelerator Facility.

**Publications:** "Multiwavelength Scophony Infrared Scene Projector", Proceedings SPIE Vol. 1311, Apr. 1990, pp. 327-339  
"New Developments in Optical Correction for Non-spherical Windows and Domes", Proceedings SPIE Vol. 2286, Jul. 1994.

**Citizenship:** U.S. citizen, born 4/20/63, NY. Security clearances.

**Activities:** Auto restoration, ultimate frisbee, soccer, skiing, and hiking.

**References:** Available upon request.