

# Stephan R. Clark

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- Objective** To obtain a consulting position in the field of optical engineering. Special interests: lens and illumination design, color science, opto-mechanical design and thin films
- Experience**
- 2013- present                      Consultant                      Little Elm, Texas
- Senior Optical Engineer** (Expert) Illumination System Design, Opto-mechanical Designer
- Leading scanner illumination projects (LED, Laser and Tungsten Halogen lamp systems)
  - Optical system design, opto-mechanics, assembly and alignment
- 2012-2013                      Hewlett Packard                      Corvallis Oregon
- Senior Opto-Mechanical Engineer** (Expert) Optical Sensor Development
- Leading team to evaluate optical architectures for ink sensors
  - Designing/Evaluating handheld spectrometer architectures
- 2009-2012                      Hewlett Packard                      Corvallis Oregon
- Senior Opto-Mechanical Engineer** (Expert) Solar Cell *VHESC DARPA project*
- Optical Design
    - Designed multiple optical architectures for use in high efficiency solar cells –dual parabola concept and sheet optics using traditional design code as well as illumination design software. Highly optimized for cost and efficiency
    - Designed reference optical coating for plastic optic dichroics
    - Developed solar concentrator measurement equipment (line tester)
  - Opto-Mechanics
    - Designed and oversaw manufacture of frame and holder and module structures for use in high efficiency solar cells (die casting)
    - Developed a thermoforming process for making sheet optics.
- 2007-2009                      Hewlett Packard                      Corvallis Oregon
- Senior Opto-Mechanical Engineer** (Expert) Color Sensor for Graphics Printers
- Optical Design
    - Lead designer of multiple Illumination and collection optics systems for color sensors-- beam irradiance shaping and power consistency required with focal plane variation. System design cost reduction ~5x
    - Designed/optimized metal etalon color filter set to Color measurement algorithm
  - Opto-Mechanics
    - Developed Prototype Housing designs and shutter mechanisms
  - Color Science
    - Lead developer of color measurement algorithm and spectral reconstruction method for printers and monitors capable of <0.5DE94 ave. color measurement accuracy
- 2003-2007                      Hewlett Packard                      Corvallis Oregon
- Senior Opto-Mechanical Engineer** (Expert) Front Projector and Rear Projection TV systems
- Optical Design
    - Designed RPTV (rear projection TV) short throw projection lens and illumination system for novel modulator technology (telecentric design architecture), modeled stray light and system performance
    - Improved initial optical design concept contrast ~100x by two novel ghost reduction design methods.
    - Developed multiple reference designs for DLP projection lenses and adapter module applications primarily short throw designs
  - Opto-Mechanics
    - Developed opto-mechanical mounting systems for DLP optical engines and UHP lamps. Part design, datuming, system tolerancing optimization and alignment—

- Created next generation UHP Lamp mount system— Improved on alignment to less than 1/5<sup>th</sup> of common loss by the use of direct datum referencing. (see patent appl. below)

2002–2003                      Agilent Technologies                      Santa Rosa, CA  
**Manufacturing Optical Engineer** (Expert)-- Optical Spectrum Analyzer (OSA), New Product Introduction

- Conceptualized, proposed, developed and implemented a deterministic alignment and test process for the next generation OSA. Results: transformed a 10hour align process with 25% yield to a 2hrs process with 80% yield in spite of 10x greater performance requirements
- Developed innovative instrumentation, a proprietary Bi-directional detector, to be used with new alignment/test process
- Assisted in critical subsystem component design and modeling
  - Analytical development of theories governing the function of depolarizers
- Developed and patented a novel component adjustment mechanism/approach (patent "Pivoting Optics Mount")

2000–2002                      Agilent Technologies                      Santa Rosa, CA  
**Manufacturing Optical Engineer**-- *Optical Spectrum Analyzer*

- Optical System modeling
- Theorized and developed a rigorous polarization performance model that was used to solve long standing inconsistencies of component performance
- Developed and filed a patent for a new compensation mechanism for polarization dependent power variations which more than doubled efficiency as well as allowing over \$350,000 of previously unusable components to be utilized in the process, (patent "Adjustable Mirror Assembly for Polarization Dependent Loss Compensation")
- Performed geometrical and physical optics system evaluations using Zemax

1996–2000                      Optical Sciences                      Tucson, AZ  
**Research Assistant/Associate**

- Idea development from conception through final instrument (next generation CMM – PhD dissertation "Stylus Profilometry with an Optical Reference")
- Designed mirror mounts, optical referencing structure for system athermalization and new air-bearing stylus assembly, performed basic structural analysis of system, wrote data analysis software—damped least squares optimization, error correction, machine control GPIB interfacing written in C main program in IDL, built laser cube interferometers.

**Education**

2000	PhD, Optical Science-- <i>University of Arizona</i>	<i>Tucson, AZ</i>
1999	MS, Optical Science-- <i>University of Arizona</i>	<i>Tucson, AZ</i>
1996	B.A., Physics-- <i>Utah State University</i>	<i>Logan, UT</i>

- (2<sup>nd</sup> language-German), Outstanding Graduating Senior

**Technical Skills**

- Optical design (Zemax, some Code V experience, Illumination software: Light Tools and FRED)— Front and Rear Projection lens design (DLP and Proprietary system), illumination modeling (systems and various light sources-UHP and LED), short throw adapter systems, Simple zooms, basic thin film design (AR and Bandpass filters), color sensor development and modeling
- Opto-mechanical design (One Space 3D modeling, some SolidWorks)—source mounts and aiming, system layout and mount design, datuming, tolerancing, alignment methods, plastic optic design, die casting and plastic molding

- Optical testing—interferometry, contact profilometry, Shack-Hartmann wavefront sensors, autocollimators, familiarity with Interference Microscopes, color measurements, projector measurements
- Optical fabrication— knowledge of lens fabrication, proto and high volume production

## Patents

- “Pivoting Optics Mount”, # 6,710,944
- “Adjustable Mirror Assembly for Polarization Dependent Loss Compensation”, # 6,876,449
- “Lamp receiver for use in projector systems”, # 7,188,959
- “Lamp bracket to illumination optics assembly interface”, # 7,546,031
- “Metal etalon with enhancing stack”, #7,508,567
- “Lamp to illumination optics assembly interface”, # 7,390,096
- “Method and apparatus for aligning optical components”, # 7,349,604
- “Lens cover”, # 7,264,362
- “Light source arrangement”, # 7,244,031
- “Shuttering and Sealing Device”, #8,179,531
- “Optical Device for Dispersing Light”, #7,894,064
- “Hard Copy Re-Emission Color Measurement System”, #8,125,625
- “Color Detector”, #8,330,955
- “Color Detector having Area Scaled Detectors”, #8,319,969
- “Color Sensing Device”, #8,390,810
- “Photovoltaic array with angular adjustment”, #8,513,584
- “Circuit limiting an absolute voltage difference between electrical paths of photovoltaic dies”, #8,513,833
- “Color Measurement Device”, #8,687,193
- “Color Sensing Device”, #8,665,438
- Many filed but not yet granted:

## Publications

“Optical Reference Profilometry”, *Trends in Optics and Photonics. Optical Fabrication and Testing. Vol 42. Technical Digest. Postconference Edition, 2000, pages 82-84*

Clark, S.R., Greivenkamp, J.E., Richard, R.M., Sasian, J.M.

“Infrared Shack-Hartmann wavefront sensor for conformal dome metrology”, *Trends in Optics and Photonics. Optical Fabrication and Testing. Vol 42. Technical Digest. Postconference Edition, 2000, pages 109-111. Smith, D.G., Greivenkamp, J.E., Gappinger, R., Williby, G., Marushin, P., Gupta, A., Lerner, S.A., Clark, S., Lee, J. Sasian, J.M.*

“Optical Reference Profilometry”, *Optical Engineering. Vol. 40:12, 2001, page 2845-*. Clark, Stephan Richard, Greivenkamp, John E.

“Ball Tip—Stylus Tilt Correction for a Stylus Profilometer”, *Precision Engineering, October 2002*. Clark, Stephan Richard, Greivenkamp, John E.

1	<a href="#">9,007,586</a>	<a href="#">Collection optics for a color sensor</a>
2	<a href="#">8,687,193</a>	<a href="#">Color measurement device</a>
3	<a href="#">8,665,438</a>	<a href="#">Color sensing device</a>
4	<a href="#">8,513,833</a>	<a href="#">Circuit limiting an absolute voltage difference between electrical paths of photovoltaic dies</a>
5	<a href="#">8,513,584</a>	<a href="#">Photovoltaic array with angular adjustment</a>
6	<a href="#">8,390,810</a>	<a href="#">Color sensing device</a>
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