SmARTlens Corporation Partners with the University of Central Florida to Redefine Photography

By Jannick Rolland

It is summer 1998. It is a hot day in Leon Mexico at El Centro to Investigationes in Optica (CIO), where I am spending a short sabbatical. The phone rings. Kevin Thompson, from Optical Research Associates (ORA®), is on the line. He is calling to discuss his recent meeting with Steve Hylén, Artist/Photographer and MovieMaker, who has invented and patented a means of taking photographs that look like “paintings”. “This is one of the two most exciting things I have seen this year,” he says. Kevin Thompson had become familiar with our work on texture-based imaging in the Optical Diagnostics and Applications (O.D.A.) Lab through the affiliates program at the School of Optics (SoO) / CREOL. He recognized that our unique skills in combining a mathematical understanding of texture with optics made us the scientific partner that Steve desperately needed. Although I made a stronger than usual commitment to myself to not take on yet another project, I became intrigued and decided to talk to Steve Hylén and to have him send me samples of his art. Looking at the samples, I am thinking … This is fabulous! I cannot decide whether I am looking at photographs or at paintings. From landscapes to portraits, each image captures a unique stroke of a painter. Are those possibly the photographs mentioned by Kevin and Steve? I am seduced, amazed, and captured by Steve’s unique artistic expressions.

Upon my first meeting with Steve Hylén at the SoO/CREOL, where I had returned, I learned that Steve started experimenting in 1969 with the concept of augmenting real images to resemble paintings at the click of a camera shot.

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Director's Corner

in Highlights (see list). In short you will be paraded to the students. I have heard estimates that companies are paying $65,000 to headhunters to hire Ph.D.’s. Hiring one of our students is a fantastic deal! Please join our affiliates.

NSF Opportunity

We are preparing a multi-million dollar multi-investigator proposal to the National Science Foundation Science and Technology Center (STC) program on “Optics at the Human Interface” in collaboration with the Institute for Simulation and Training and others on campus as well as at other universities, industry and government labs. The pre-proposal is due on August 11. Mike Bass will serve as the PI and Director and Eduardo Salas from IST as co-Director. We are currently sending out letters of request for support, both financial and moral, as well as to test the waters for interest in this project. The STC-Optics at the Human Interface (OHI), will research how to best coordinate and link optics and learning with the goal of optimizing human reception and retention of information, i.e. how optics can best affect and accelerate learning. People learn most efficiently when the human visual system is supplied with information that is 1) properly acquired 2) processed 3) transmitted 4) displayed and, finally, 5) perceived and understood. The first 4 topics concern the optical science and engineering essential to providing visual information. The fifth, which directs much of the research in the first four topical areas, is on human-systems integration, involving studies of human visual perception and advanced distributed learning environments.

Please contact Mike Bass at bass@creol.ucf.edu for more information and, if you want to participate with us please make arrangements with Mike to be included.

Dr. Craig Siders joins the School of Optics faculty from the University of California at San Diego

Craig comes to the SoO from Kent Wilson’s group in UCSD, where he was the Director for X-Ray Sciences. Wilson’s long-held dream of watching matter move with ultrafast x-rays was fulfilled by the hard work of Craig and the international X-Ray Team assembled at UCSD, resulting in three major publications in the field of ultrafast x-ray diffraction (Nature 398, 310 (1999), Science 286, 1340 (1999), and PRL 85, 586 (2000)) in Wilson’s last year before succumbing to cancer this spring. Prior to UCSD, Craig was a Director’s Funded Postdoctoral Fellow at Los Alamos National Laboratory where he developed novel sources of sculpted THz waveforms for studying ultrafast carrier dynamics in semi- and super-conducting materials.

Craig’s graduate work was performed under the guidance of Mike Downer and Toshi Tajima at the University of Texas at Austin and involved both the design and construction of table-top terawatt lasers and their application to the generation and measurement of laser-driven plasma-based electron accelerators. Craig’s thesis centered upon the first time-resolved measurement of a laser wakefield accelerator.

Craig is an avid fisherman, photographer, and nature enthusiast. Whether it be by fishing a remote mountain stream, landscape photography, or advanced computer graphics and simulation, Craig has enjoyed a life-long passion of visualizing the natural world.

Craig met his wife Jennifer, also a physicist, in a drawing class at Kenyon College. An ardent educator, Jennifer will be pursuing part-time teaching opportunities in the Orlando area. They are both overjoyed with their first child, Charlie, who was born in February.
Since then, he had developed, with essentially hand-made and commercially available lenses, the seed for what today constitutes the SmARTlens Corporation technology.

What was most amazing about Steve Hylén’s work was the professional look of the work, given such limited means. The drive to join in was strong because of the highly creative component of the work. Steve Hylén’s energy, enthusiasm, and vision was at its maximum, in spite of the challenges he had experienced for years in attempting to form a team that would cohere both from the business perspective and the research capability. As part of an academic unit, the experience of collaborating with a startup company is surely challenging. Shortly before meeting Steve, I had just extracted myself from an unsuccessful experience with other potential industrial partners who were attempting to exploit our texture research for biomedical imaging. But, with outstanding leadership, such as I have experienced with SmARTlens advancing the success of the company. Several of them are active as board members. Being part of SmARTlens Corporation is like being part of a tight family, where members are connected to each other via network webs and telephone lines, and most importantly, a common driving force, that of Redefining Photography.

SmARTlens Corporation has spent the past year developing its products, acquiring patents, and producing prototype hardware, software, and images. In year 2000, The University of Central Florida joined in the partnership by awarding the O.D.A. Lab an 14-Corridor award to match research development funds provided by SmARTlens Corporation. Current products under development include:

The Prograin™ modifier, which allows the user to add a grainy look to photographs, a feature highly desired by professionals, and one that I have learned to appreciate. Steve Hylén selected the Polaroid Commercial Optics Division to manufacture this product.

The SmARTlens™ Universal Converter Housing (SUCH), which is an optical unit conceived in the O.D.A. Lab and final-designed for manufacture by ORA. Coastal Optical Systems Inc. has built several prototypes to date. The SUCH mounts between the body of the camera and the objective lens and allows merging of a texture phase plate located within the SUCH to a photograph. The resulting effect is that of a painting. The texture phase plates are designed in the O.D.A. Lab and manufactured by Rochester Photonics Corporation and Micro-Optics Photonics.

The SmARTlens™ Regional Focus Control modifier (SRFC), which provides for nonlinear focus areas of virtually any size within a proposed image. This is being developed in the O.D.A. Lab, in close collaboration with Steve Hylén.

And finally, Voila! ARTware, which is developed in the O.D.A. Lab and integrates with a GUI interface designed by Steve Hylén. This software serves to convert photographs into artistic prints and also constitutes for the O.D.A. Lab a research tool to predict the refraction of the light through various texture plates located in a camera.

Students of the O.D.A. Lab who have contributed to the research and development include Hong Hua on optical system design, Vesselin Shaoulov on optical instrumentation and modeling, Yann Argotti on software development and modeling, and Avni Ackay and Ben del Vento on programming.

At the 2000 Photo Marketing Association International (PMAI) show in Las Vegas, SmARTlens™ won the Digital Imaging Marketing Association (DIMA)’s prestigious “Most Innovative Product 2000” award. Myself, as well as Kevin Thompson from ORA, and Jay Kumler from Coastal Optical Systems Inc., were helping SmARTlens Corporation in the presentation of several prototypes we had helped create for demonstration at the booth. Upon arriving at the booth in the morning of the second day of the convention, where we had joined in for the day, it was true joy to see the award. We were sincerely taken by surprise, as it was the first PMAI show for SmARTLens Corporation and the booth and the show materials had been pulled together in a very short time. Randall Abney was ecstatic. Steve Hylén was honored. And all of us joined them in their ecstasy and pride. We all had worked around the clock for days for the success of the show, each in our own unique way. The award brought a sense of team completion and unity in spite of the rapidly evolving work we were (and are still) all engaged in for the Company. Champagne flowed soon after! The other companies honored for their innovative digital products were Astron Systems, Canon U.S.A. Inc., Fuji Photo Film U.S.A. Inc., Eastman Kodak Co., and Sony Electronics Inc. Exceptional company for a start-up!

All of us are looking forward to the next PMAI show, which will be held in Orlando, Florida in February 2001.

We hope to see you there!
On Friday April 28th, the School of Optics/CREOL held its Annual Industrial Affiliates’ Day meeting. Organized to foster partnerships and increase communications between the School/Center and all branches of the optics and laser industrial community, the meeting drew participants from corporations across the country as well as government agencies, federal laboratories, and other universities. This year’s meeting was without a doubt our most successful Affiliates’ Day meeting. With a total attendance of 120, of which over 70 were from outside UCF, we saw many new representatives from corporations for the first time. This will certainly lead to stronger relationships between laser and optics corporations and the School/Center. Already several new companies have become official members of our Industrial Affiliate Program while others have renewed their memberships. We are glad to welcome A C Materials, Advanced Integrated Photonics, Inc., ApliCote Associates, Applied Photonics, Inc., Lee Laser Inc, Melles Griot, Inc., Microvision, SurgiLight, and Zygo Corporation, as Affiliates.

The meeting, which was more highly publicized than in previous years was organized to expose to industry the many new and frontier technologies being developed at SoO/CREOL. It also fielded a number of presentations highlighting the many local support agencies and programs, such as the Central Florida Business and Technology Development Center, Economic Development Commission of Mid-Florida, Florida Electro-Optics Industry Association, and Florida High Tech Corridor Council, that can help laser and electro-optics companies in the Central Florida region. Two invited talks, from well known experts in the field of telecom optics development provided this year’s focus on recent developments in this field. Dr. Fred E. Leonberger, Senior Vice President & Chief Technology Officer of JDS Uniphase spoke on “Advances in Commercially Deployed Components for DWDM Fiber Optic Systems,” and Mr. Peter Atwal and Mr. Mark Crumblish of MILCOM, Melbourne, FL, spoke on “The World Leader in Commercializing Military Technology.”

During both the morning and evening sessions, special guided tours of specific laser and optics demonstrations were organized. In addition, an extensive poster session was organized in which some 36 senior graduate students of the School/Center demonstrated their results. Many corporate representatives took this opportunity to become acquainted with those students who will soon be graduating. In the current dynamic employment market, our students are attracting impressive offers, in many cases with starting bonuses and stock options.

A $500 travel grant, donated by Mr. Charles Gramm was awarded to Mr. Gabriel Popescu, chair of the CREOL Association of Optics Students (CAOS) for his research and outstanding leadership and many contributions to the student organization. Mrs. Anna Tabirian won a briefcase for best student poster, entitled “New, efficient, room temperature mid-infrared laser at 3.9 µm in Ho:BaY2F8, Anna M. Tabirian, Hans P. Jenssen, and Arlete Casanho. Posters were judged by a panel selected from our Industrial Affiliates. The day’s events were brought to a conclusion with an informal reception, followed by a meeting of the School/Center Board of Visitors, which made recommendations for the future development of our Industrial Affiliate Program.
Papers Published:


D. Jacob, Steven Dunn, and M. G. Moharam, "Narrow Band Dielectric Resonant Grating Reflection Filters with finite Lateral Length", Annual Meeting of the Optical Society of America, Santa Clara, CA October 1999.

P. J. Delfyett, “Hybrid WDM-TDM technologies for optical networking, instrumenta-


Book and CD-ROM Chapters:


Papers Presented at Conferences:


Patents:


CREOL Affiliates

AC Materials
Winter Park, Florida

Advanced Integrated Photonics, Inc.
Princeton, New Jersey

ApliCote Associates
Lake Mary, Florida

Applied Photonics
Orlando, Florida

The Boeing Co.
Canoga Park, California

Charles Gramm
St. Petersburg, Florida

Cobb Family Foundation
Coral Gables, Florida

Laser Science, Inc.
Franklin, Massachusetts

Lee Laser, Inc.
Orlando, Florida

Litton Laser Systems
Orlando, Florida

Melles Griot, Inc.
Irvine, California

Microvision
Bothell, Washington

Schott Glass Technologies, Inc.
Duryea, Pennsylvania

Schwartz Electro-Optics Inc.
Orlando, Florida

Sinclair Optics Inc.
Fairport, New York

Solution Technology, Inc.
Monroe, North Carolina

SurgiLight, Inc.
Orlando, Florida

Zygo Corporation
Middlefield, Connecticut

Schwartz Fellowship Fund

The Schwartz Fellowship Fund has been created in honor of Bill Schwartz, who passed away July 23, for all he has done to help CREOL, and the laser and optics industry in Central Florida. Income from the fund will support student fellowships. To discuss a donation contact Dr. Eric Van Stryland, Interim Director of School of Optics/CREOL at 407-823-6835.
Optics Company Formed in Partnership with UCF
by Dr. David Hagan

UCF is entering into a partnership with School of Optics (SoO) researchers to commercialize technology developed in SoO/CREOL’s research laboratories. SoO researchers Dr. Florencio Hernandez and Dr. David Hagan recently invented a new device for wavelength-independent rotation of polarization, for which a Patent is now pending. This device is primarily expected to find applications in R&D as well as with tunable laser manufacturers and users. To market this technology, the inventors are forming a new company, Polara, in which UCF will have a 10% equity share.

The polarization rotators, based on liquid-crystal technology that renders them insensitive to wavelength and gives them a very large field-of-view, offer considerable advantages over existing devices for the rotation of polarization. A major application of polarization rotators is to use them between linear polarizers to provide attenuation of laser power. Although linear polarizers can be quite broadband, wave plates, which are currently used for polarization rotation, are inherently wavelength dependent. With the recent widespread availability of broadly tunable lasers and OPO devices, there is a growing need for wavelength-independent rotation of polarization, for which a Patent is now pending.

Peter Delfyett Receives Black Engineer of the Year Award

Peter Delfyett was selected to receive the Outstanding Alumnus Achievement Award from the 2000 Black Engineer of the Year Awards Selection Committee. Each year these awards are given to candidates whose qualifications and performance place them in the ranks of the Nation’s highest achievers in technology. This year, the award winners were recognized at the Fourteenth Annual Black Engineer of the Year Awards Conference, February 17-19 2000, at the Renaissance Harborplace Hotel, in Baltimore, Maryland.

The Black Engineer of the Year Awards Conference is held annually, and this year, was hosted by Lockheed Martin Corporation, the Council of Historically Black Colleges and Universities, and US Black Engineer & Information Technology Magazine. Additional corporate sponsorship came from General Motors, Daimler Chrysler, Boeing, IBM, Texas Instruments, TRW, Hewlett Packard, Raytheon, along with the Navy and the US Army Corps of Engineers. Candidates for the awards are nominated by their employer, with candidates being represented from government agencies, universities or non-profit research facilities, or for-profit corporations. This year, Dr. Delfyett was the only recipient from an academic institution.

Dr. Delfyett was recognized for his research contributions in the development of ultrafast semiconductor lasers for applications in ultrahigh speed optical telecommunication, computer and signal processing applications. It should be noted that in 1993, Dr. Delfyett received the Black Engineer of the Year Award as the Most Promising Engineer. The receipt of this year’s Outstanding Alumnus Achievement Award is recognition that he is living up to his promise.
Faculty News

Peter Delfyett received the 2000 Excellence in Graduate Teaching Award - School of Optics.

George Stegeman became a fellow of the American Physical Society.

Glenn Boreman has been elected a Fellow of OSA and of SPIE.

Kathleen Richardson has been appointed to be Leader of the U.S. Technical Advisory Group (TAG) to International Standards Organization (ISO)/TC 172/SC 3 Optics and Optical Instruments (2000).


At the XII International Symposium on Non-Oxide Glasses and Novel Optical Materials held in April 2000 at Florianopolis, Brazil, Kathleen Richardson was awarded the Young Researcher Symposium Prize. This award is given at the symposium, held every 2 years, and is awarded for “outstanding work in the field of non-oxide glass and new optical glass research” to a researcher under the age of 40. The symposium’s International Advisory Committee selects the recipient based on a nomination and full CV summarizing activities/accomplishments in the field.