Anthony W. Yu

16119 Drayton Farm Dr
Spencerville, MD 20868

H(301)421-9291
C(703)622-6915
email: tony@iecteam.com

BIO SUMMARY:

Anthony W. Yu – Has more than 20 years of experience in laser physics, optics and optoelectronic device design, research and development. As a researcher in the area of photonics, he led basic research, development and production of semiconductor and solid state laser products for applications in space based remote sensing, lidar, free space optical communications and telecommunications. His expertise extends from DFB laser modules, high power solid state lasers, to passive components, semiconductor and erbium fiber optical amplifiers and optoelectronics packaging designs. He has written numerous referred technical papers and presented at international conferences. He has extensive experience in the technology and implementation of the following devices and systems: fiber-based laser systems, laser communication systems, high power solid state lasers, and laser diodes and in the broad areas of management of laser-based instruments, systems, and constituents. He earned a Bachelor's degree in Physics from the University of Central Florida and a Ph.D. in Physics from the Georgia Institute of Technology.

RELATED WORK EXPERIENCE:

Feb 2006 - Present

Laser Physicist, NASA Goddard Space Flight Center, Greenbelt, MD

Lead laser physicist on the Lunar Orbiter Laser Altimeter (LOLA) space flight mission. Duties involved laser design, building and verifying laser performance on breadboard, engineering model and flight lasers, data analysis, interface with other subsystems and space qualification of laser system. Heavily involved in free space laser communications, imaging ladar for spacecraft autonomous rendezvous and docking applications and optical parametric generation for trace gas detection R&D programs. Lead IRAD effort in the development of optical parametric oscillator (OPO) for trace gas detection. Lead scientist in the development of laser transmitter for Free Space Laser Communication IRAD at NASA. Led IRAD effort in high peak power, low stimulated Brillouin scattering (SBS) fiber lasers and amplifiers development for atmospheric trace gas, laser communications and imaging ladar. PI on Instrument Incubator Program (IIP) on Efficent Swath Mapping Laser Altimetry Demonstration. Led IRAD effort on 3D nonscanning imaging ladar system development. Led IRAD effort on 885 nm diode pumped ceramic Nd:YAG laser development. Lead laser physicist on ICESat II laser system development, which is tentatively schedule for 2014 launch.

PI – NASA Earth Science & Technology Office (ESTO) Instrument Incubator Program (IIP) Efficient Swath Mapping Laser Altimetry Demonstration
PI – NASA Earth Science & Technology Office (ESTO) Qucik Response Advanced Component Technology (ACT) on 885 nm Pumped Ceramic Nd:YAG Laser Development

Oct 2003 – Feb 2006

Sr. Advisory Systems Architect, Northrop Grumman Corporation, Baltimore, MD

Advisory system engineering support in EO/IR sensors, free space laser communications, LADAR, laser designator, laser rangefinder, active and passive obstacles avoidance systems, and FLIR. Lead system engineer of the Airborne Lasercomm Terminal (ALT) development program for USAF. Lead system engineer for laser based obstacle avoidance system and laser radar on the Unmanned Combat Armoured Rotorcraft (UCAR) for DARPA. Key member of the Systems Development and Technology (SD&T) Department as an advisory to senior management on new electro-optic sensor business development and technology. Conceive of new and innovative approaches and techniques to laser, EO/IR sensors, active and passive EO sensors, free space laser communications, adaptive optics, and aero-boundary, laser beam propagation in atmospheric turbulence development and the deployment of those developments in enabling scientific discoveries and develop new business area for the company.

April 2001 – Oct 2003

Sr. Optoelectronics Packaging Engineer, - Quantum Photonics Inc, Jessup, MD

Successfully designed, demonstrated and transferred to manufacturing optical system for coupling semiconductor FP lasers, SLEDs and SOAs to single mode and polarization maintaining fibers with over 70% coupling efficiency and

met Telcordia GR468 qualifications. Directly involved in research and development of next generation amplifier modules for metropolitan optical network applications. Led development effort with leading automation vendor and successfully integration of an automated laser welding station for butterfly packaged semiconductor devices in manufacturing production line. Developed test procedures and production test stations for packaged devices.

April 2000 – April 2001
Sr. Laser Physicist, NASA Goddard Space Flight Center, Greenbelt, MD
Completed and delivered three space qualified diode pumped solid state lasers for the Geoscience Laser Altimeter System (GLAS) space flight instrument (successful launching of instrument on January 24 2003 and activated February 20, 2003). Designed and developed test procedures for qualification of space flight lasers. Led research effort in detection of atmospheric trace gases using differential lidar technique with semiconductor laser diodes with EDFA. Performed fundamental and applied research in the wavelengths from ultraviolet to near infrared region and the development, design, test, evaluation, application, and use of optical techniques, components, and systems for measurement and sensor applications. Worked on risk reduction of space based lasers.

April 1994 – April 2000
Chief Scientist, Raytheon ITSS, Lanham, MD
Heavily participated in all aspect of the GLAS laser instrument for the ICESAT flight program from pre-phase A, PDR, CDR, Engineering Model development, integration and testing and on time delivery of flight lasers. Designed, modeled, developed, integrated, tested and qualification of a diode pumped solid state laser system for the GLAS flight mission. Lead optical engineer of the GLAS laser transmitter responsible in the development of technical specifications, interacting with vendors, procuring and receiving of flight optical components for GLAS. Developed work instructions in testing and qualification of flight optics in compliance of GSFC ISO9000 protocol. Task leader for the development of the ranging lasers internal calibration subsystem for use in space flight project GAMES (Gravity and Magnetic Earth Surveyor). Assisted in the Cassini/Composite Infrared Spectrometer (CIRS) Instrument Development Team in the alignment, integration and calibration of optical detector subsystem.

Investigated the behavior of electron compensation effects on diffraction efficiency of a fixed holographic optical filter. Extensive theoretical and experimental study in second harmonic generation using lithium triborate (LBO) for the GLAS laser. Successfully demonstrated the use of injection seeding technique for frequency stabilization of high power active and passive Q-switched solid state lasers. Performed research in discrete semiconductor MOPA laser system for applications such as differential absorption lidar (DIAL), remote sensing, laser altimetry and communications. Investigation of external cavity semiconductor laser configuration to reduce frequency chirp and maintain single longitudinal mode operation under large signal modulation. Research in various schemes to stabilize spectral and modal properties of high power semiconductor laser diode under large signal modulation for applications requiring single frequency laser sources. Designed, developed, implemented, and characterized a semiconductor diode laser master oscillator Nd:YLF power amplifier MOPA laser.

Section manager of a twenty-two professional staffs (12 Ph.D., 6 M.S and 4 B.S.) team supporting NASA GSFC on solid state detectors, space optics research and system integration and testing.

Led a technical writing team in the support of Raytheon and GSFC proposal efforts.

June 1991 – April 1994
Chief Scientist, Hughes STX, Lanham, MD
Extensive study of a 1 micron wavelength MOPA laser transmitter for communication applications. Investigation of parasitic free frequency response of semiconductor lasers by four wave mixing technique. Developed a computer model to study the dynamics of an integrated semiconductor master oscillator power amplifier (MOPA) laser. Assisted in the successful demonstration of a diode pumped, diode seeded Nd:YLF regenerative amplifier.

June 1991 – June 1993
Principal Scientist, Hughes STX, Lanham, MD
Successfully implemented a master oscillator power amplifier (MOPA) laser transmitter system for applications in laser communications, laser ranging, and LIDAR. The system consists of a diode pumped solid state laser amplifier and semiconductor laser. Implemented an active alignment feedback control system for optical alignment of two semiconductor laser diode beams for a laser beam combiner system designed for intersatellite communications

system. Responsible for the design and development of a laser beam combiner (LBC) for use in the NASA Free space Optical Communications Intersatellite Simulator (FOCIS) program. Demonstration of pointing, acquisition and tracking subsystem (PATS) in satellite optical communications applications by implementation of coarse and fine tracking loop breadboards

July 1988 - June 1991
Member of Technical Staff, GTE Laboratories Incorporated, Waltham, MA
Performed link budget analysis for free space microwave cellular communications and fiber optics based communication networks. Provided comparative assessment of different fiber optics network architecture for fiber-to-the-home deployment. Theoretical investigation of electromagnetic waves propagation in urban environment for mobile communication by developing mathematical models based on diffraction theories for prediction of field strength in urban environments. Implementation of a 1.2 Gbit/s direct detection FSK fiber optic communications system with erbium fiber preamplifier. Designed tunable optical filter for used in dense WDM and/or FSK optical transmission system. Theoretical study of imperfect Fabry-Perot filters and their impact on the performance of optical transmission system utilizing such devices. Responsible for the investigation of four-wave-mixing and gain saturation effects in semiconductor laser amplifiers. Developed a theoretical model that predicts the crosstalk and intermodulation distortion level in a multichannel optical transmission system. Theoretical investigation of nonlinear optical effects, such as four-wave-mixing, Rayleigh and Brillouin scattering, in optical fibers and their effects on multichannel optical transmission systems.

AWARDS:

1986 Sigma Xi Outstanding M.S. Thesis Award

1047 nm Laser Diode Master Oscillator Nd:YLF Power Amplifier Laser System
NASA Certificate of Recognition, June 22, 1993

High Power, High Bandwidth Laser Diode Transmitter Module
NASA Certificate of Recognition, September 3, 1997

Cassini/Composite Infrared Spectrometer (CIRS) Instrument Development Team
NASA Group Achievement Award, June 16, 1998

EDUCATION:

Jan. 1984 – Aug. 1988
PhD Physics, School of Physics, Georgia Institute of Technology, Atlanta, Georgia
Thesis: Stochastic Effects in Single and Multimode Lasers.
Advisor: Professor Rajarshi Roy

Sept. 1982 – Dec. 1983
MS Physics, School of Physics, Georgia Institute of Technology, Atlanta, Georgia
Thesis: Variable Transmission Output Coupler and Tuner for Ring Laser Systems.
Advisor: Professor Rajarshi Roy

Sept. 1978 - June 1982
BS Physics, Department of Physics, University of Central Florida, Orlando, Florida.

ACTIVITIES:

Member of IEEE, OSA, and the Photonics Society of Chinese Americans
Member of Raytheon Laser and Laser System Core Competency Team, 1994 - 2000
Member of Hughes Electro-Optics and Sensors Technology Network , 1991 - 1994

REFERENCES: Furnished Upon Request