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Tribute to James C. Wyant: The Extraordinaire in Optical Metrology and Optics Education

**Virendra N. Mahajan
Daewook Kim**
Conference Chairs/Proceedings Editors

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James C. Wyant

The Extraordinaire

Career and Awards



JAMES C. WYANT
THE EXTRAORDINAIRE

James C. Wyant

James C. Wyant is professor emeritus at the College of Optical Sciences at the University of Arizona where he was Director (1999–2005) and Dean (2005–2012). He received a B.S. in physics from Case Western Reserve University and M.S. and Ph.D. in optics from the University of Rochester.

CAREER

Wyant was a founder of the WYKO Corporation and served as its president and board chairman from 1984 to 1997. He was also a founder of the 4D Technology Corporation and currently serves as its board chairman. Wyant is a member of the National Academy of Engineering, a Fellow of OSA (Optical Society of America), SPIE (International Society of Optics and Photonics), and Distinguished Fellow OSI (Optical Society of India), an honorary member of the Optical Society of Korea, and former editor-in-chief of the OSA journal Applied Optics. He was the 2010 president of OSA and the 1986 president of SPIE. In April of 2019, the College of Optical Sciences at the University of Arizona was renamed to be the James C. Wyant College of Optical Sciences in his honor.

AWARDS

AccountabillT Lifetime Achievement Award from the Arizona
Technology Council
Arizona's "Innovator of the Year" Product Award
Arizona Technology Council William F. McWhortor Award
Doctorado Honoris Causa from the Instituto Nacional de Astrofisica, Optica y
Electronica in Puebla, Mexico
Honorary Doctor of Science Degree, University of Rochester
OSA Joseph Fraunhofer Award
SPIE Chandra Vikram Award
SPIE Gold Medal
SPIE Technology Achievement Award
SPIE Visionary Award
Tom Brown Excellence in Entrepreneurship Award
University of Arizona Technology Innovation Award
University of Rochester College of Engineering Distinguished Alumnus Award

CONFERENCE CHAIRS



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Preface

It has been a great honor for us to work on this Tribute to James C. Wyant, The Extraordinaire in Optical Metrology and Optics Education. It was in the making for two years starting from an idea and initiation to execution and producing the SPIE Proceedings. Our first step was to get Jim's okay to hold a tribute for him, get Kent Rochford's agreement for SPIE sponsorship, and Dean Tom Koch to give his blessings. Once that was done, we prepared a Call for Papers for SPIE which they announced in December 2019 for a tribute celebration conference at SPIE Optics + Photonics in San Diego in August 2020. We sent invitations to all of Jim's former students and professional colleagues to present their tribute papers. We prepared slightly different invitations for different groups such as Jim's professional colleagues, his former PhD and MS students, and some special invitees.

Because Jim had been retired since 2014, we did not focus on technical presentations at the tribute. We encouraged contributors instead to focus on how Jim had impacted their lives and present accolades attributed to him. In short, we wanted the tribute to be a fun and joyful event. Thus, from the outset, our emphasis was on recollections and reflections of experiences with Jim. Of course, people were also free to present technical papers on any of the topics that were outlined in the Call for Papers.

Since we wanted to make sure that the event was not based solely on our thinking, we formed a program committee by inviting some of our colleagues to participate as members. Four of them are graduates of the College of Optical Sciences and the fifth is a faculty member. Some international perspective was added by one of the four who is a Slovenian American working in Leon, Mexico at the Centro de Investigaciones en Óptica, A.C. (CIO). Of course, we ourselves are also graduates of the same College.

We received over 30 abstracts, mostly from Jim's professional colleagues and his former students, but a few from others. We divided the papers into 7 sessions each under the title of a specific characteristic of Jim and allotted each speaker 15 minutes, but only 10 minutes each to ourselves over a two-day period. The characteristics include the Extraordinaire, Leader, Educator, Metrologist, Inspirer, Enabler, and Futurist. Because most of the speakers were in the invited and, therefore, guest category, we had a strong desire to hold a dinner for all. A dinner gathering would also provide an opportunity for Jim to thank the speakers for their participation.

As we began working on the details of our tribute program, we also started wondering if we will be able to hold the tribute in August 2020 as planned, because of the growing concern over the looming COVID-19 pandemic. Once SPIE decided that O + P would be a digital forum, it became clear that we would

have to postpone the tribute for a year. We felt strongly that a tribute by its very nature should be held in person. After careful discussions with the program committee members and checking with Jim, we decided to postpone the tribute to August 2021. We announced the postponement in the O + P 2020 meeting program and in the Watts Up Newsletter of the Wyant College. By then, we had plenty of papers so there was no need to solicit more, and we transferred all abstracts to the SPIE August 2021 meeting.

Call for Papers



Tribute to James C. Wyant: The Extraordinaire in Optical Metrology and Optics Education (OP301)

Conference Chairs: **Virendra N. Mahajan**, Wyant College of Optical Sciences (USA); **Dae Wook Kim**, Wyant College of Optical Sciences (USA)

Program Committee: **Katherine Creath**, Optineering (USA); **John B. Hayes**, 4D Technology Corp. (USA); **Masud Mansuripur**, Wyant College of Optical Sciences (USA); **Joseph A. Shaw**, Montana State Univ. (USA); **Marija Strojnik**, Centro de Investigaciones en Óptica, A.C. (Mexico)

This conference is dedicated to celebrate Professor and Dean James C. Wyant's extraordinary contributions and services to the fields of optical metrology and optics education. The focus of his research has been on applying the science of interferometry to precision metrology and sensing applications in various fields including computer-generated holograms, data storage, wavefront sensors for adaptive optics, optical fabrication, and optical system engineering.

Authors should submit papers they believe have been inspired or enabled by Jim's work. It is an opportunity to tell him how their lives have been impacted by their coming in contact with him. Anecdotal experiences and observations relating him to their work and life are encouraged.

Suggested topics for papers include, but are certainly not limited to:

- Applied interferometry, holography, and speckle
- Applications: phase-measuring, interferometric fringe analysis
- Absolute calibration: flats, spheres, windows, etc.
- Measurement of aspheres and freeforms
- Diffractive/Holographic null correctors: computer generated hologram
- Wavefront sensors
- Figure, ripple, and roughness: power spectral density measurement and analysis
- Mid-spatial-frequency optics errors: detection, characterization, effects, and mitigation
- Testing in adverse environments: vibration, atmosphere, cryogenic, vacuum, etc.
- Subsurface damage: detection, characterization, effects, and mitigation
- Surface profilometry: optical and scanning probe

We held program committee meetings on Zoom to work out the details of the tribute program and producing hardcover edition of the Tribute Proceedings. Because SPIE was not planning to produce their usual hardcopy book of the O + P meeting program, we discussed preparing a special tribute program brochure. Working closely with the organizers, SPIE staff prepared a beautiful program brochure. We decided to request the speakers who may not be able to present their papers in person to send their recorded presentations in advance so that we could show them during their scheduled place in the program. The hybrid format helped to keep the flow of the presentations in line with the program schedule.

The Tribute conference was very well attended on each of the two days, the 2nd and 3rd of August 2021. Our guest of honor, Jim, stayed in the conference room and attentively listened to each presentation. We knew that Professor Robert R. Shannon had submitted his manuscript but did not plan a video presentation, so we went to the next best person to speak in his place. We were so relieved and pleased when Jim agreed to do so. He told some amazing stories about working with Bob and how he influenced Jim's life. His memorable talk about his relationship with Bob was enjoyed by everyone.

To get community support for the tribute dinner, we called a couple of optics companies, and they happily agreed to contribute. We designated Dr. John Hayes, who was not only a former student of Jim but also his business partner, as our finance manager, and he reluctantly accepted the bestowed honor. He and Larry Johnson immediately volunteered to contribute to the dinner fund. John also got a commitment from Dean Tom Koch of the Wyant College to help fund the dinner and publication of a special edition of the Tribute Proceedings. Before we finished collecting funds, we asked SPIE if they would also fund the dinner. They graciously offered to host a tribute luncheon. An excellent buffet luncheon was held at Marina G. Hall in the Marriott Marquis Hotel. Jim thanked some 40 guests at the luncheon.

We asked Tammy Orr, the Wyant College historian, to write a short biography of Jim to show not only who he is but also relate where he had come from. When the Tribute conference was postponed to August 2021, she published the biography she had written in the OSC Website. She updated it some for the Tribute Proceedings, which now appears as the leading article followed by the papers written by those who spoke at the Tribute in the same order as in the scheduled program.



Wyant Tribute Luncheon Participants on 3 August 2021

(From left to right) John E. Greivenkamp, Kay Greivenkamp, Thomas G. Brown, Rick Plympton, Jim Schwiegerling, Clarissa M. DeLeon, Isaac L. Trumper, Jessica DeGroot Nelson, Joseph A. Shaw, Ritva A. Keski-Kuha, Peter H. Smith, Ray Williamson, Thomas L. Koch, Brent C. Bergner, Daewook Kim, John B. Hayes, Kent Rochford, Shashi Mahajan, Virendra Mahajan, Masud Mansuripur, James C. Wyant, José Sasián, Tammy Orr, Kaye Rowan, Russell A. Chipman, James B. Breckinridge, Hong Hua, Siddhartha Sirsi, Elliot Eichen, James E. Harvey, Karola Schumann, Jack Schumann, Chunyu Zhao

We are grateful to John for managing the finances, Tammy Orr for writing Jim's biography, Kaye Rowan for collecting and providing addresses of the invitees, Melissa Griffiths for mailing the invitations, Ameer Hennig for announcing the Wyant Tribute in the OSC Watts Up Newsletter, Matt Novak for his constant support for the Tribute activities, Carrie Binschus for designing the Tribute Program brochure, and Nicole Harris for compiling the tribute Proceedings Volume. We also thank the tribute speakers for their participation and all who attended this tribute to honor Jim Wyant.

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Conference Chairs and Proceedings Editors