

History of Magnetorheological Finishing



Daniel C. Harris

Senior Scientist and Esteemed Fellow
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China Lake, California

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Sloan Auditorium, Goergen 101
Refreshments served

This talk recounts the history of the development of MRF and the founding of QED Technologies.

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Abstract: Magnetorheological finishing (MRF) is a deterministic method for producing complex optics with figure accuracy <50 nm and surface roughness <1 nm. MRF was invented at the Luikov Institute of Heat and Mass Transfer in Minsk, Belarus in the late 1980s by a team led by William Kordonski. When the Soviet Union opened up, New York businessman Lowell Mintz was invited to Minsk in 1990 to explore possibilities for technology transfer. Mintz was told of the potential for MRF, but did not understand whether it had value. Mintz was referred to Harvey Pollicove at the Center for Optics Manufacturing of the University of Rochester. As a result of their conversation, they sent Prof. Steve Jacobs to visit Minsk and evaluate MRF. From Jacobs' positive findings, and with support from Lowell Mintz, Kordonski and his colleagues were invited in 1993 to work at the Center for Optics Manufacturing with Jacobs and Don Golini to refine MRF technology. A "preprototype" finishing machine was operating by 1994. Prof. Greg Forbes and doctoral student Paul Dumas developed algorithms for deterministic control of MRF. In 1996, Golini recognized the commercial potential of MRF, secured investment capital from Lowell Mintz, and founded QED Technologies. The first commercial MRF machine was unveiled in 1998. It was followed by more advanced models and by groundbreaking subaperture stitching interferometers for metrology. In 2006, QED was acquired by and became a division of Cabot Microelectronics. This talk recounts the history of the development of MRF and the founding of QED Technologies.

Biography: Dan Harris is a Senior Scientist and Esteemed Fellow at the Naval Air Systems Command in China Lake, California, where he is responsible for research and development programs in infrared window materials. He has degrees in chemistry from MIT and Caltech. He is the author of the SPIE monograph "Materials for Infrared Windows and Domes," the text "Symmetry and Spectroscopy," and 13 editions of the two leading undergraduate textbooks in analytical chemistry.

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