26 October 2023

IEEE PIKES PEAK SECTION

PIKES PEAK JOINT ELECTRON DEVICES/CIRCUITS & SYSTEMS CHAPTER REACTIVATES ON SILICON MOUNTAIN

The Pikes Peak Joint Electron Devices/Circuits & Systems Chapter held it's first meeting in 4 years on the University of Colorado-Colorado Springs (UCCS) campus on October 26. The Chapter was founded in 1981 to focus the growing semiconductor industry on Silicon Mountain. The industry hit some hard times in the 1980s and 1990s as some manufacturing plants were closed. Silicon Mountain is seeing a resurgence of activity recently as the result of the Chip Act.

DAVID BONDURANT

David Bondurant, Pikes Peak Section Chair, talked to a group of 27 member of the Chapter and UCCS students and members of the student branch. His topic was "Non-volatile RAM for the Internet of Things (IoT)" which describe the status of the Ferroelectric RAM, Magnetoresistive RAM, and Resistive RAM technology and products and why non-volatile RAM was perfect for Internet of Things applications.

This talk was particularly significant since the Ferroelectric RAM first was developed in the UCCS Microelectronic Laboratory by Dr. Carlos Araujo and Dr. Larry McMillan who founded Ramtron in 1984. Colorado Springs was also home of Simtek, a developer of the non-volatile SRAM. Both companies were acquired by Cypress Semiconductors which is now owned by Infineon Technologies. Non-volatile RAM products continue to be developed today by Infineon on Silicon Mountain.

The speaker is a former VP of Marketing at Ramtron and Director of Marketing at Everspin Technologies. He worked for Ramtron, Simtek, Freescale & Everspin Technologies, leaders in three non-volatile RAM companies.

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IEEE LMAG

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The Pikes Peak LMAG celebrated its Global LMAG Achievement Award with an in-person meeting held at Macaroni Grill in Southwest Colorado Springs on October 23, 2023.

DAVID BONDURANT
Chair (Section, LMAG)

Chair, David Bondurant, explained that Silicon Mountain was the name of Colorado Springs during the 1970s, 1980s, 1990s and early 2000s. We no longer use this name but we are somewhat in a resurgence with the Chip Act encouraging an $800M expansion of Microchip Technologies and a Swiss company planning to expand the old Intel fab with $480M investment in a solar panel manufacturing operation. The panel will review the foundations of Silicon Mountain starting in the 1970s.

FORD MICROELECTRONICS

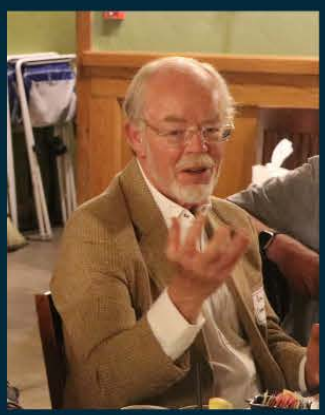
Steve Barton was working at Intel Corporation in late 1970s when Ford Motor Company decided to develop microprocessors for engine controls. He was involved with development of 8096 microprocessor design for Ford. This was early in microprocessor era and Ford's demand for 5M microprocessors in one year was too much for Intel. Ford decided to develop a captive semiconductor company to build the processor in 1982.

STEVE BARTON

It was initially housed in Ford Aerospace facility in Colorado Springs before their own building was complete a couple of years later. Steve moved to Ford to complete the project. Ford built a $33M GaAs manufacturing facility to serve military & aerospace business at 9965 Federal Drive in 1985. In 1999, Ford closed the manufacturing line but kept an 80-person design team. The manufacturing facility was acquired by Intel in 2000.

INMOS CORPORATION

Don Carrigan started at TI but later worked for NCR Microelectronics in Colorado Springs briefly. He told the story of the founding of Inmos where he was one of the first 39 employees. Inmos was founded by Dr. Richard Petritz, John Heightly, and Paul Schroeder. Dr. Petritz had been VP of Research at TI when he founded Mostek, a leading DRAM company in Dallas. Paul Schroeder was a key DRAM



DAN CARRIGAN

designer. They were looking to start a new company. They met Ian Barron, an English microprocessor developer. He was able to help them raise $120M to found Inmos Corporation with plan to develop memory and microprocessor products. The memory company was located in Colorado Springs at a new facility near Quail Lake. Inmos developed

64K & 256K DRAMs. Their 256K was the first 256K CMOS DRAM and the fastest DRAM available by early 1985. By 1984, Inmos was losing money due to Japanese entry into DRAM market so company was sold to Thorn EMI, then ST Microelectonics. Ultimately the facility was closed and later sold to Cray Computer. The DRAM design team moved to Ramtron, a Colorado Springs startup. Others from Inmos founded Simtek, a non-volatile SRAM company..

MOSTEK, UNITED TECHNOLOGIES, UTMC, AEROFLEX, COBHAM, FRONTGRADE TECHNOLOGIES

John Reinert started at Motorola and later moved to NCR Microelectronics in Colorado Springs. In 1979, Mostek, the world leader in DRAMs, decided to build a major DRAM factory in Colorado Springs.

JOHN REINERT

John went to work for them in Product Engineering. Mostek successfully manufactured 64K and 256K DRAM in the facility but were under financial pressure due to Japanese entry into the DRAM market. Mostek was sold to United Technologies.

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Mostek successfully manufactured 64K and 256K DRAM in the facility but were under financial pressure due to Japanese entry into the DRAM market. Mostek was sold to United Technologies. They were a major aerospace company. They had developed a United Technologies Microelectronics Center (UTMC) next door to the Mostek fab. When UT/Mostek was sold to STMicroelectronics, John moved to UTMC which built high reliability & radiation hard semiconductors. The UT/Mostek fab would be sold to Rockwell International who would expand it. They would then sell to Intel Corporation. UTMC would become Aeroflex, Cobham, and finally Frontgrade Technologies continuing as a leading supplier of military and aerospace electronics.

NCR MICROELECTRONICS

Gene Freeman worked at NCR Microelectronics early in his career.

GENE FREEMAN

NCR created NCR Microelectronics in Colorado Springs in 1975 to build DRAMs for their computer business. They would ultimately license 16Kb DRAM from Mostek and build them at a factory near the Colorado Springs Airport. Gene told the history of NCR as a mechanical calculator company in Dayton, OH.

They had difficulty adapting to emerging world of electronic calculators and computers due to their mechanical focus.

They would ultimately significantly downsize their operation in Dayton, diversify manufacturing around the country. NCR Microelectronics was part of the diversification.

NCR Microelectronics would build DRAM, Microprocessors, and Complex I/O chips. The local company would become AT&T, Symbios Logic, LSI Logic, Avago, and Broadcom. The manufacturing facility became Dpix and InnovaFlex Foundry .

As mentioned earlier in this report, the Pike Peak LMAG celebrated in receiving the 2023 Global LMAG Achievement Award. We were selected in competition with 140+ LMAG worldwide. It was based upon our activities in 2022 and our grant program with the National Museum of WWII Aviation to support a student simulation lab in support of UCCS students.

This LMAG activity started during June 2021 to visit a presentation on simulation projects for the National Museum of WWII Aviation. A simulation project was proposed to involve IEEE Student Branches and Section members. The presentation was given by Verne Patterson from the museum. Past students were involved with creating a 3-D printed replica of the Norden Bombsight used by bombardiers to accurately land bombs. Kevyn joined 4 other students in developing the computer imaging of a B-17 dropping bombs on a target using real physics for bomb trajectory based on inputs from the replica Norden Bombsight.

During 2022, funding was a joint venture, namely: contributions were made by IEEE Pikes Peak Section (Chair, Dr John Santiago), LMAG Chapter (Chair, David Bondurant and Lead), and Computer Society Chapter (Chair, Gene Freeman), with John Reinert as Section Treasurer.

More information about Section activities at https://site.ieee.org/pikespeak