

**AGI**

Abbie Gregg, Inc.

Engineering ♦ Consulting ♦ Technology ♦ SEMI ♦ FPD ♦ BIO ♦ NANO

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Highlights of the University of Louisville Nanotechnology Cleanroom

The University of Louisville had the opportunity to create their new Micro/NanoTechnology Center as part of the recently constructed \$50M Belknap Research Building (BRB). They had been working in a cramped 1500 sq. ft. cleanroom for the past 10 years and stockpiling tools waiting for the opportunity to create their world-class facility. The user group had swelled and the variety of devices being produced included everything from custom ASICs to Lab-on-a-Chip systems to sensors, microhotplates, and other MEMS devices. This success enabled Prof. Kevin Walsh and his team including Cleanroom Manager Mark Crain to stake out 10,000 square feet of prime space on the ground floor of the new Belknap Research building. The building layout allowed the expanded cleanroom facility to have an optimal location, accessible for storage and distribution of hazardous materials as well as excellent viewing, good vibration and EMI characteristics, and proximity to critical imaging areas. Additional planning for adequate air handling interstitial height was critical in bringing the cleanroom up to Class 100 conditions and providing temperature and humidity control adequate for the photolithography area performance.

AGI's task was to insure that all tools so carefully acquired over the 10 year period, as well as a set of new and safely designed wet process stations, were properly accommodated in the new cleanroom. The new, multiple wet bench capabilities relieved the process limitations inherent in the previous cleanroom where wet processing was limited by safety, potential cross contamination and crowding of personnel. All process tools were carefully grouped within the seven bays to provide optimum work flow and appropriate cleanliness, as well as segregation of bio related clean space. Utility demands were evaluated to insure adequate central systems and distribution, utilizing a partial "dirty subfab". Hazardous materials storage, distribution, life safety systems and abatement were comprehended in the cleanroom design to insure capability to continue to use the wide variety of chemicals necessary for today's Micro/Nano/Bio research.

Users, consultants, architects, engineers, constructors and furnishings suppliers each had significant Team roles from Programming through Design, Construction and Tool Installation at the University of Louisville Belknap Micro/NanoTechnology Center to insure a comfortable, usable and safe facility that will provide a flexible, world class cleanroom for advanced research for the next 20 years. You will get to see the cleanroom which is easily viewable from the attractive main aisle, as well as some of the adjacent support areas. AGI will also compare this cleanroom in terms of cost,

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layout and user priorities, to some of our other recent projects such as: Duke University CIEMAS, Lawrence Berkeley National Labs Molecular Foundry, University of Michigan SSEL expansion, Harvard LISE, UC Berkeley CITRIS, ASU ERC and FDC, and nanoGUNE San Sebastian, Spain. AGI has also managed Sandia National Labs Microfab Readiness Assessment, and assisted Argonne National Labs and Oak Ridge National Labs CNMS with Cleanroom design and tool hookup consulting. AGI has performed peer reviews of cleanrooms and labs as part of such projects as the Georgia Tech and UC Riverside Nanofabs, QMT R&D Fab, and University of Notre Dame Stinson Remick Hall Cleanroom.

Abbie Gregg, President of AGI



Abbie Gregg has a background including fifteen years as an Engineering Consultant specializing in microelectronics process analysis and startup/restructuring of laboratories and manufacturing facilities. Her previous experience is in process engineering and operations management, and technical strategic planning for major semiconductor device manufacturers. Her areas of specialization include Flat Panel Displays, Flexible Displays and Batteries, Integrated Circuits, Microphotonics, MEMS, Disk Drive Components, Biochip/Medical devices/images and Multichip Modules.

As President of AGI, she has completed over 500 projects including Wafer Fab, MEMS, Flexible Electronics, Nanotechnology, and FPD Projects in USA, Europe, Canada, Malaysia, Taiwan, Japan, and Korea. Her recent work includes accommodation of 90 nm CMOS processing on 300mm wafers and nanotechnology research for University and Government laboratories.

She has developed a database and software system for computer aided layout, utility loading, and design of cleanrooms, advanced laboratories and characterization / imaging areas. Abbie's team also developed software model for semiconductor and FPD product cost, outsourcing analysis, cost of ownership and factory simulation. She has done extensive turn-around consulting, assisting technical operations in project management, and implementing continuous improvement methods.

Abbie holds a B.S. in Materials Science from the Massachusetts Institute of Technology, and studied Electrical Engineering at the University of Maine.