Vertically Integrated Projects (VIP)

Virtual Twins@Birck

Virtual Twins Video

Registration for VirtualTwins@Birck

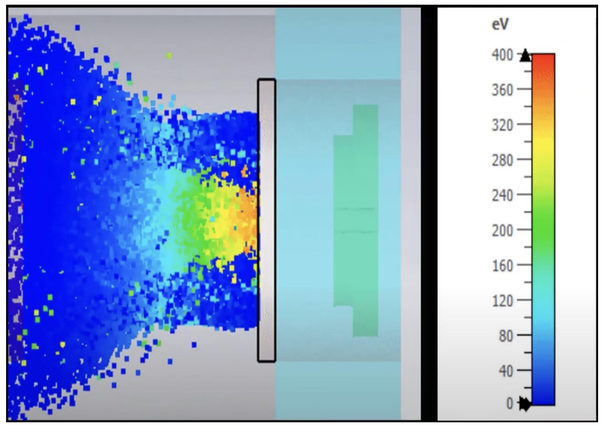
Birck Nanotechnology Center, a crown jewel of the Purdue campus, is the largest and most advanced academic cleanroom and characterization facility in the U.S.

OVERVIEW

In this VIP project course, students will develop digital twins-driven VR-based experiences to gain a deep understanding of cleanroom operations and details of semiconductor fabrication equipment & processes.

Scifres Cleanroom at Birck Center

Skills Developed: Semiconductor Unit Fabrication Process Modeling; Kinematic Modeling of Semiconductor Equipment; Digital Twins & Virtual Reality (VR)



Physics-based Modeling & Simulation of Semiconductor Processes

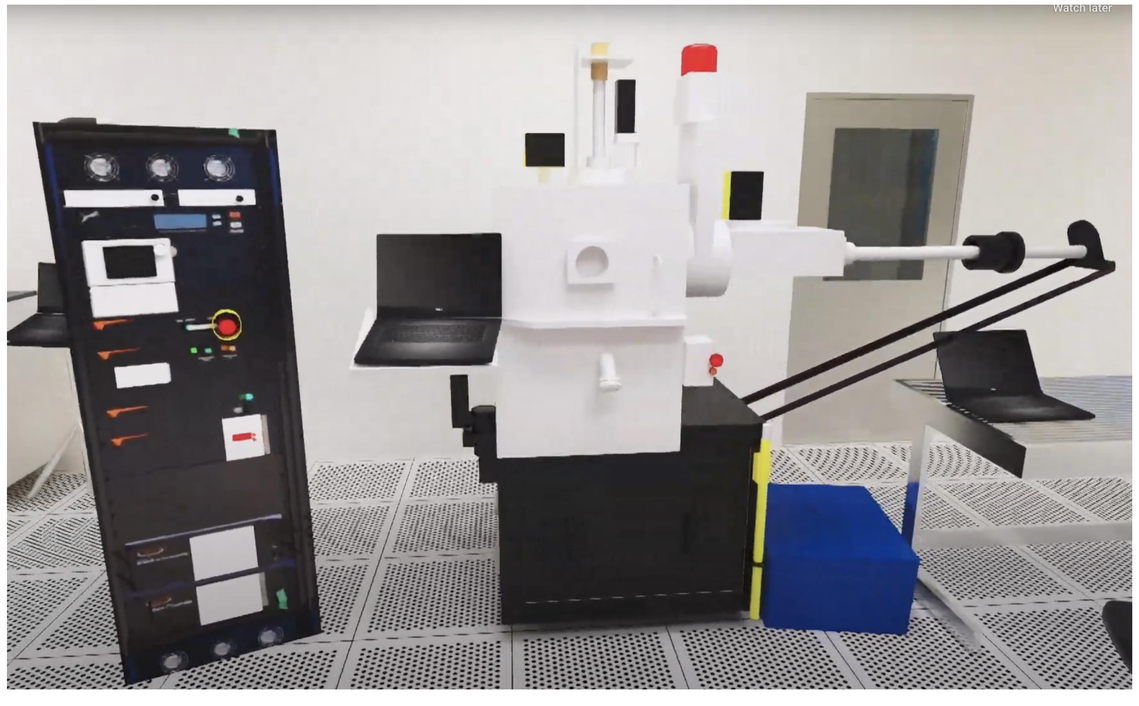
Using SIMULIA from Dassault Systèmes' 3DEXPERIENCE platform, we develop physics-based simulations for semiconductor unit fabrication processes. Through this work, you will gain a comprehensive understanding of process mechanisms and deep insight into the key parameters.

https://birck.research.purdue.edu/

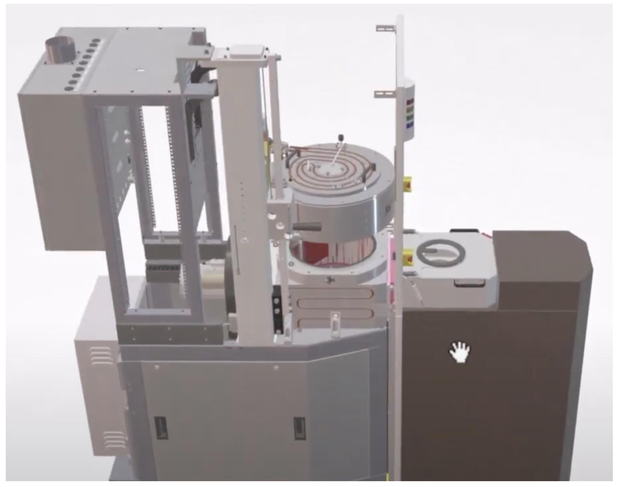
Prof. Zhihong Chen (zhchen@purdue.edu)

Creative Experience & Story Telling

In this final stage, we integrate the equipment's kinematic motion with the process simulations. Using Dassault Systèmes' 3DEXPERIENCE platform, we transform these combined elements into a photorealistic, physics-based, and interactive visual narrative, creating an immersive experience that will be deployed on AR/VR platforms such as the Apple Vision Pro for workforce training & development.



https://www.youtube.com/watch?v=jAYozbDWTNE&t=12s



Kinematic Modeling of Equipment Operation

Using CATIA from the 3DEXPERIENCE platform, we define the precise mechanical motions and operational ranges of each subassembly, establishing the foundational geometry and movement framework for the final simulation.

PURDUE UNIVERSITY | Birck Nanotechnology Center