

e-Manufacturing & Design Collaboration Symposium 2018

Invited Speech:

Automated Data Analysis and Performance Tuning in DUV Light Source



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About the Speaker

Rahul Ahlawat is a Senior Manager in the Program Development group for Deep-UV (DUV) light source at Cymer (ASML), where he leads the development of advanced algorithms and next generation products. He has over 10 years of experience in automotive and semiconductor equipment industries, and has over 25 patents and peer-reviewed publications. He serves as a reviewer for several leading academic journals in the field of dynamic systems & control and numerical optimization. He holds M.S. and Ph.D. degrees in Mechanical Engineering from the University of Michigan, Ann Arbor, with specialization in estimation & control.

Abstract

Productivity expectations from the DUV light source continue to increase, driving the need for smarter and more robust tool operation. While mission critical control and optimization algorithms exist on board the light source that execute fast control loop (us to s time scale), the current light source lacks automated long term monitoring capabilities (days to months' time scale). This talk will present the development of a new platform that enables long term data analysis, signature detection, and that can execute pseudo real-time algorithms. This platform is implemented outside the light source to prevent adding significant additional computational load on core light source controllers, provides scalability as well as providing the flexibility for more frequent updates without interrupting tool production.

The platform is designed to query periodic data, parse and store in database. Once data is available, all algorithms can use this data to find appropriate signatures and then adapt the tool operation by adjusting control parameters. One of the first applications for this methodology is discussed that provides performance based dynamic gas life times (refills) where algorithm monitors KPIs and actuator ranges to determine if gas life can be continuously extended. This talk will also cover the methodology behind this algorithm along with key challenges such as feature selection and optimal threshold selection. Other future applications will also be discussed.