A Vision of Future Machine Tools

Radu Pavel, TechSolve, Inc.
Steven Schmid, UNC Charlotte
Greg Harris, Auburn University

Blue Sky Competition
NAMRC 2023
Definitions

u•biq•ui•tous. Adjective. Present, appearing or found everywhere

la•tent. Adjective. Of a quality or state existing but not manifest; hidden or concealed

The future of Machine Tools is ubiquitous and latent AI.
Introduction
The Vision

Like this one to show what is going on.
Introducing Carly

- Natural Language Interface
- Communicate Current Status
- Recall Part and Process Data
- Obtain Outside Information
- Virtual ERP-assisted Schedule
- Auto-contracting
Intelligent Scheduling

- Natural Language Interface
- ERP Access
- Machine Learning for Production Options
- Flexible, Secure Communications
Production Planning

Virtual ERP Access
Multiple Process Models
Internet CFP with Encrypted Files
Vendor Ranking
Cyber Bidding and Contracts
Quality Revolution

ERP Access
Reflects Speaker
Digital Twins of Machines
Multiphysics Models – Suited to Preference
Scheduling and AI in Supply Chain

MSC Supply
Hybrid Manufacturing

Simulation-driven Process Selection
Automation Used as Necessary
On-Machine Metrology
Quantum Processor
Summary

- The future of machine tools is strongly integrated with advances in computer science, including fields like Artificial Intelligence, Deep Machine Learning, Big Data, Communication and Cybersecurity.

- The trend is to simplify interfaces and to make additional tools latent and ubiquitous. Significant effort directed towards learning program operation are eliminated, but workers do need their base skills.

- Far from an archaic technology, machine tools are on the verge of a high-tech revolution. Funding in this area can dramatically influence worker productivity.
Acknowledgements

- Carly Schmid
- Joel Neidig & ITAMCO
- Jamie Goettler & MSC Industrial Supply
- Rob Caron & Caron Engineering
- NSF Blue Sky Program
- NSF Future of Manufacturing Program
“The era ahead should be exciting for all people and we look forward to it with great enthusiasm.”

Dr. M. Eugene Merchant