



**DEPARTMENT OF MECHANICAL ENGINEERING
Purdue School of Engineering and Technology**

SPRING 2003 SEMINAR SERIES

Date: Friday, February 28, 2003

Time: 4:00 pm – 5:00 pm

Room: SL 165

**Reception at 3:45 pm (cookie and refreshments served)
Everyone is invited**

**Prediction of Dimensional Accuracy in CNC Milling Using
Computational Intelligence Techniques**

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Some of the most common machining operations used in industry are flat end milling and face milling. As more emphasis is placed on quality and productivity in manufacturing, it has become evident that controlling the dimensional accuracy (e.g., surface roughness, waviness and flatness) is a critical need. A number of accuracy prediction models are available in the literature but with very limited applicability on the floor level. This is due to the fact that the process is highly non-linear with a large number of inter-dependent cutting parameters. An innovative approach for process modeling and prediction of accuracy is explored and implemented in this work. Two techniques from the field of Computational Intelligence namely, Particle Swarm Optimization and Neural Network were considered. Radial Basis Neural network (RBNN) model found to be the most attractive in terms of developmental time and accuracy with a 10% error. This is an improvement over the existing models in literature. Design of experiment (DOE) approach was used for the data collection including random, fractional factorial and full factorial DOE's. The fractional factorial approach was found to be the most economical in terms of accuracy, time and cost.
