

May 9, 2022  
12pm - 1pm  
STEM Center  
D-301



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**Agyeman-Duah**

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Ashwin  
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**De La Cruz-Sevilla**

Leonardo  
**Fusser**

Maxime  
**Huynh**

Dylan  
**Patel**

Muhammad Daood  
**Rajpoot**

Josué  
**Reisler**

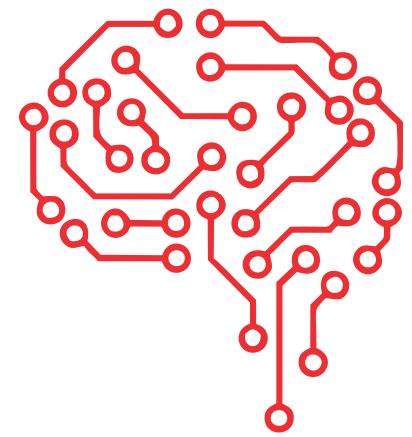
Kaushikmerin  
**Thommaipillai**

Massimo  
**Valentini**

John Salik, Eng.

Professional  
Development Series

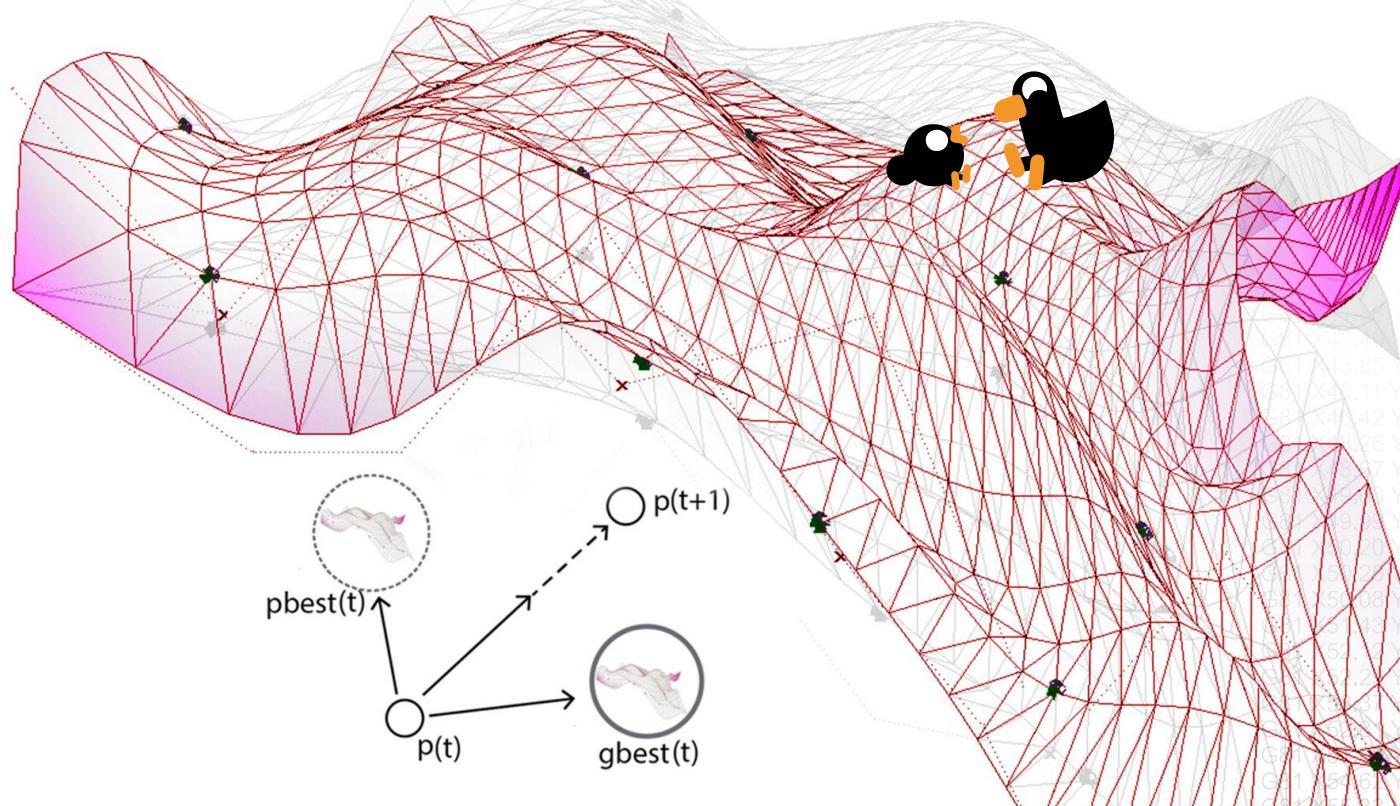
# Basic Concepts in Artificial Intelligence



## Technical Talk for Advanced Students, Faculty and Staff

This talk is intended to provide entry points into two fundamental areas of artificial intelligence: clustering and stochastic optimization techniques. Several presenters will introduce learning mechanics with introductory topics that are essential to anyone considering future work in hardware or software AI.

The talk will include a practical AI implementation on a production-ready robotic controller designed and developed during the Winter 2022 session by senior CET students.

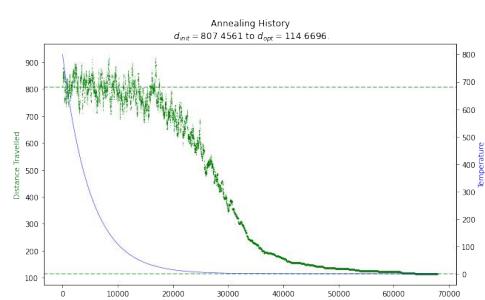


### Clustering

Data types and scaling methods.  
Distance metrics and dimension reduction using principal component analysis. K-Means, DBSCAN, and hierarchical clustering. Decision Trees.

### Stochastic Optimization

Cost functions, simulated annealing, genetic algorithms, particle swarm optimization.



### Using Simulated Annealing to find an Optimal Tool Path for a CNC Drill

Developed within the Computer Engineering Technology program, a robotic controller is used to simulate the drilling process that is required for the

manufacturing of PCBs. Presented with an arbitrary number of points drill points (for vias, components or screws) the problem of minimizing the tool path is solved using simulated annealing and sent to a hardware G-Code interpreter. This interpreter is a custom PCB designed for this internally developed product and may be adapted to other purposes such as 3D printing, laser cutting or other use.

