

## INTRODUCTION TO BAYESIAN NETWORKS

A professional short course by Innovative Decisions, Inc. | **August 14-16, 2018**

Bayesian networks are probabilistic models that enable a user to understand an uncertain situation, explore what-ifs, and consider the collection of new data. They synthesize knowledge from experts and case data.

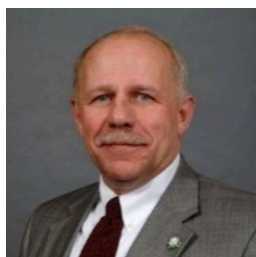
- Learn to elicit Bayesian network structures and probabilities from experts
- Build Bayesian networks from simple to real-world applications
- Dennis, Dave, Joe, and Bob teach from decades of experience applying Bayesian networks in national security, government and industry
- Learn about building geospatial models in GeoNetica and combining Netica with discrete event simulation
- Learn about advances in Bayesian network tools and applications
- Practice learning Bayesian network structures and probabilities from data
- Rapid fire model building exercises to develop formulation expertise

**LOCATION** IDI Offices 8230 Old Courthouse Road Suite 460, Vienna, VA 22182

**For more information contact:** [dmbuede@innovativedecisions.com](mailto:dmbuede@innovativedecisions.com)



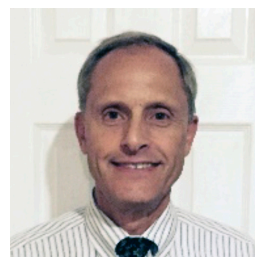
Dennis Beude



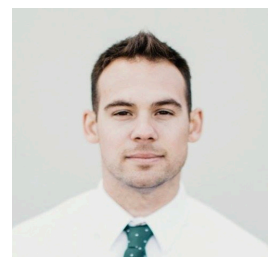
Dave Brown



Bob Powers



Joe Tatman



Jared Beekman

- Day 1**
- Introduction
  - Building a simple Bayesian network (BN) – drug testing
  - Just enough probability
  - A complete diagnostic BN - Liver diagnosis case study
  - Elicitation of BN structure and probabilities
  - Causal Models

- Day 2**
- Troubleshooting systems - Netica car diagnosis example
  - Troubleshooting systems - Industrial system example
  - Learning probabilities for a BN from data
  - Student Workshop (opportunity to work on your own BN problem)
  - D-Separation and sensitivity to findings
  - Combining expert knowledge and data
  - BN Building Practicum
  - Learning structure for a BN from data

- Day 3**
- Netica API
  - Student Workshop
  - Learning a BN with continuous variables
  - Introduction to GeoNetica™
  - Student Workshop
  - Dynamic Bayesian networks / Incorporation of evidence over time

### Advanced topics available on a case-by-case basis

- Continuous variables - Model aggregation example & discretization
- Named probability distributions in Netica
- Inference and basics of the propagation algorithm behind BNs
- Bayesian network formulation practicum – build lots of BNs
- Decision making in Netica using influence diagrams
- Using the Netica library in the ExtendSim discrete event simulation

*Class runs 8:30 to 4:30 each day. Topics subject to change.*

*Please visit for [www.innovatedecisions.com/bn-course](http://www.innovatedecisions.com/bn-course) for latest info & list of nearby lodging options.*

**COST** \$1,950 includes all handouts and drinks and light snacks throughout the day.

A discount of \$200 for early registration is available (if registered by July 10). We also offer a discount for multiple persons from the same organization.

The course is very hands-on. **Please bring a laptop.** Also, please think about a problem you can work on during Student Workshop time.



Innovative Decisions, Inc.

For more information visit: [www.innovatedecisions.com/bn-course](http://www.innovatedecisions.com/bn-course)  
or contact [dmbuede@innovatedecisions.com](mailto:dmbuede@innovatedecisions.com)