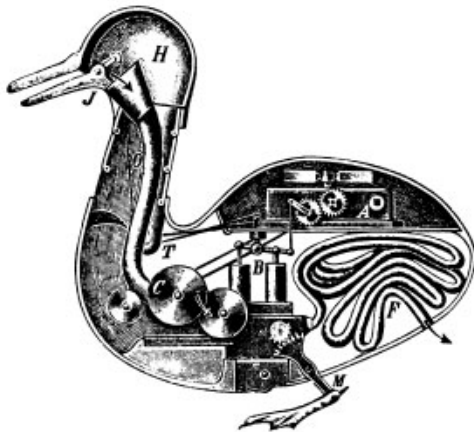


# Opening the Black Box

Exploring Epistemic Trajectories

Daniel Rosenberg | Kaustuv DeBiswas



## Spring 2010 | Thursdays 6-8pm | Rm: TBD

The objective of the seminar is to generate a discussion around computation literature from different domains - from Psychology to AI, from Art to Science, from Philosophy to Cybernetics. We will read several classics and inquire proposed epistemic models in terms of the philosophy, language, process and form - eventually seeking to find connections and linkages between them.

Students can take this seminar as an independent study and get credits. There are only two requirements: to read as much as possible and to come to the meetings. The idea is to practice active reading or aggressive skimming to get an overall understanding of the texts, looking for interesting arguments and ideas to be discussed in the meetings. There are no additional assignments and grading would correspond simply to participation.

### Calendar

February 1-5: Introduction  
February 8-12: The Starting Point  
February 15-19: Process and Form  
February 21-26: Learning from the Real-world  
March 1-5: Invention and Discovery in Art  
March 8-12: Invention and Discovery in Science  
March 15-19: Emotion Machines  
March 22-26: No class (Spring Break)  
March 29-2: Research in Design  
April 5-9: The Origin of Ideas  
April 12-16: Creative Learning  
April 19-23: Tools  
April 26-30: Games  
May 3-7: Collective Thoughts  
May 10-14: Conclusions

### Readings

#### February 8-12: **The Starting Point**

Simon, H. *The Sciences of the Artificial*. Cambridge: MIT Press, 1996.

Schön, D. *Educating the Reflective Practitioner. Toward a New Design for Teaching and Learning in the Professions*. San Francisco: John Wiley & Sons, 1987.

Stiny, G. *Shape. Talking about Seeing and Doing*. Cambridge: MIT Press, 2006.

#### February 15-19: **Process and Form**

Alexander, C. *Notes on the Synthesis of Form*. Cambridge: Harvard University Press, 1964.

Holland, J. *Emergence : from Chaos to Order*. Reading Mass.: Perseus Books, 1999.

Wolfram, S. *A New Kind of Science*. Champaign IL: Wolfram Media. 2002.

Knight, T., and Stiny, G. "Classical and Non-Classical Computation." *Information Technology*, 5(4), 355-372, 2001.

### February 21-26: **Learning from the Real-world**

Brooks, R. *Cambrian Intelligence: The Early History of the New AI*. Cambridge Massachusetts: MIT Press, 1999.

Brooks, R. "Intelligence without Representation." *Artificial Intelligence*, 1991: 139-159.

Winston, P. *Artificial Intelligence*. Cambridge, Massachusetts: Addison-Wesley, 1992.

Aboaf, E., Drucker S., and Atkeson C. "Task-level robot learning: Juggling a Tennis Ball More Accurately." *IEEE*, 1989: 1290-1295.

### March 1-5: **Invention and Discovery in Art**

Kubler, G. *The Shape of Time. Remarks on the History of Things*. New Heaven and London: Yale University Press, 1962.

Gombrich, E. *Art and Illusion. A Study in the Psychology of Pictorial Representation*. London: Phaidon, 1960.

Arnheim, R. *Art and Visual Perception: a Psychology of the Creative Eye*. Los Angeles: University of California Press, 1954.

### March 8-12: **Invention and Discovery in Science**

Kuhn, T. *The Structure of Scientific Revolutions*. Chicago and London: The University of Chicago Press, 1962.

Rheinberger, H. *Toward a History of Epistemic Things. Synthesizing Proteins in the Test Tube*. Stanford: Stanford University Press, 1997.

Pickering, Andrew. "Decentering Sociology: Synthetic Dyes and social Theory." *Perspectives on Science*, 2005: 352-405.

### March 15-19: **Emotion Machines**

Minsky, M. (2007). *The Emotion Machine: commonsense thinking, artificial intelligence, and the future of the human mind* (1st ed.). New York: Simon & Schuster Paperbacks.

Segal, L. *The dream of reality Heinz von Foerster's Constructivism*. New York: Springer-Verlag, 2001.

Maturana, H., and Varela, F. *The Tree of Knowledge*. Boston: Shambala, 1992.

### March 22-26: **No Meetings (Spring Break)**

## March 29-2: **Research in Design**

Latour, B. *Science in Action: How to Follow Scientists and Engineers through Society*. Cambridge: Harvard University Press, 1987.

Kohler, R. *Lords of the Fly: Drosophila Genetics and the Experimental Life* Chicago: University of Chicago Press, 1994.

## April 5-9: **The Origin of Ideas**

Bartlett, F. *Remembering: a Study in Experimental and Social Psychology*. London: Cambridge University Press, 1961.

James, W. *The Principles of Psychology*. Cambridge and London: Harvard University Press, 1981.

Piaget, J. *Psychology and Epistemology*. New York: Grossman Publishers, 1971.

—. *The Child's Conception of Space*. New York: The Humanities Press, 1956.

—. *The Construction of Reality in the Child*. New York: Basic Books Inc., 1954.

## March 12-16: **Creative Learning**

Dewey, John. *The Quest for Certainty: A Study of the Relation of Knowledge and Action*. New York: Minton, Balch & Company, 1929.

Resnick, M. "All I Really Need to Know (About Creative Thinking) I Learned (By Studying How Children Learn) in Kindergarten." *Proceedings of the ACM SIGCHI conference on Creativity & Cognition*. Washington DC., 2007.

Sawyer, K. *Explaining Creativity: the Science of Human Innovation*. New York: Oxford University Press, 2006.

## April 19-23: **Tools**

Rheingold, H. *Tools for Thought: the History and Future of Mind-expanding Technology*. Cambridge Massachusetts: MIT Press, 2000.

Braitenberg, V. *Vehicles: Experiments in Synthetic Psychology*. Cambridge Massachusetts: MIT Press, 1986.

Papert, S. *Mindstorms: Children, Computers, and Powerful Ideas*. New York: Basic Books, 1993.

## April 26-30: **Games**

Gee, J. *What Video Games have to teach us about Learning and Literacy*. New York : Palgrave Macmillan, 2007.

Turkle, S. *The second Self: Computers and the Human Spirit*. Cambridge Massachusetts: MIT Press, 2005.

Habraken, J. *Concept Design Games. Book Two: Playing*. Cambridge Massachusetts: MIT Press, 1987.

### **May 3-7: Collective Thoughts**

Fleck, L. *Genesis and Development of a Scientific Fact*. Chicago and London: The University of Chicago Press, 1979.

Whitman, R. (n.d.). *Anigrafs: Experiments in Collective Consciousness*.

Wenger, E. *Cultivating Communities of Practice: a Guide to Managing Knowledge*. Boston: Harvard Business School Press, 2002.