Master Information Evening

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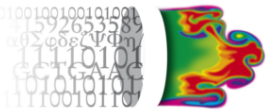
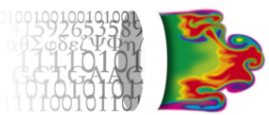
November 8, 2012



Background.

- BSc Physics & Astronomy.
- One year at TU Delft (MSc Applied Physics).
- Currently master thesis at ING bank.



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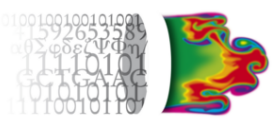
Personal experience with this programme.

Personal motivation:

- Interdisciplinary subjects.
- More aimed at the world after graduation.

Experience:

- Small classes.
- Wide variety of choices in courses.
- Project-based assignments, usually in groups.
- High motivation among students, high degree of independence.
- Good connection with the PhD-group and teachers/researchers.



Introduction in Computational Science.

- Correcting deficiencies.
- Introduction to certain types of models like dynamical systems.

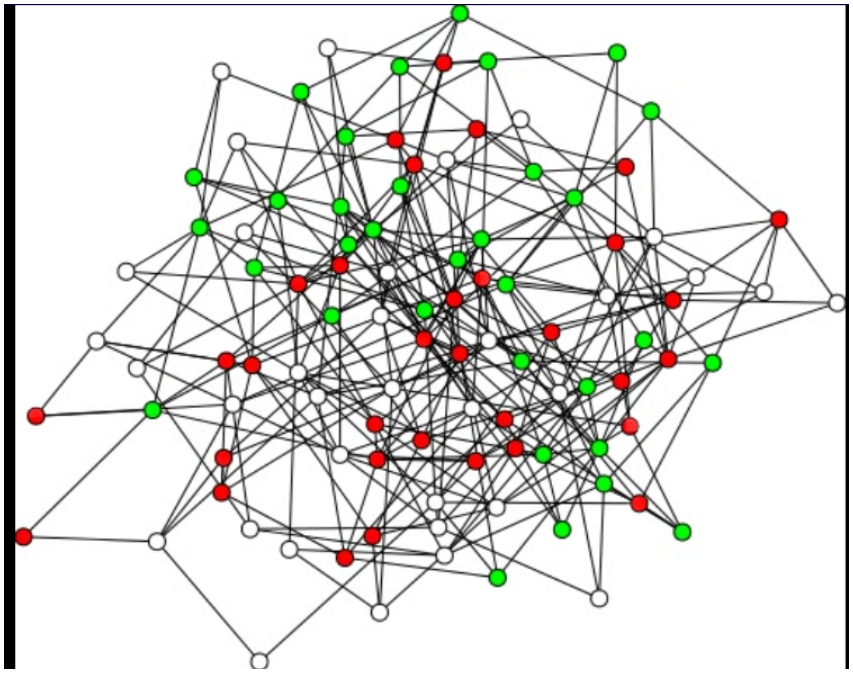


Figure: Disease spreading on a network.

Stochastic Simulation.

- How to use probability theory in modeling? → e.g. MC-simulations.
- Random number theory.

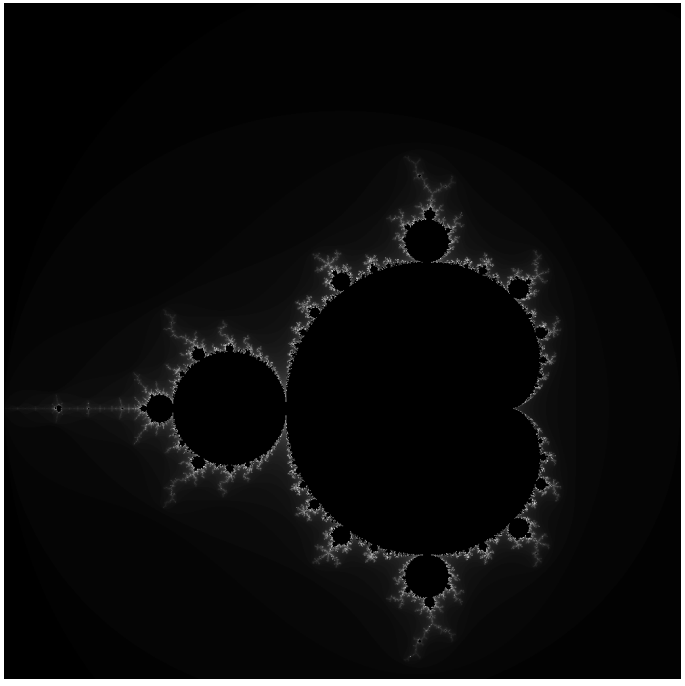


Figure: Mandelbrot set.

Concurrent Programming.

- Learning about parallel paradigms and applications.
- Getting familiar with many paradigms (e.g. pThreads, MPI)

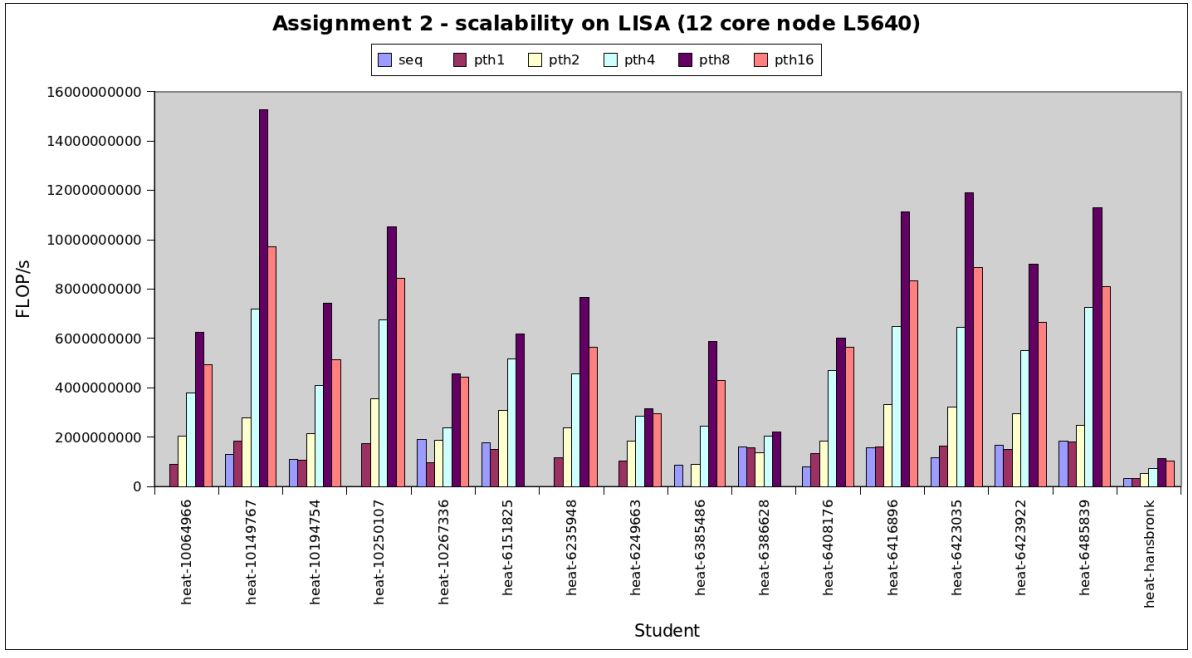


Figure: Competition on performance.

Computational Finance.

- Principles of quantitative finance.
- Derivation of important formulas for option pricing.

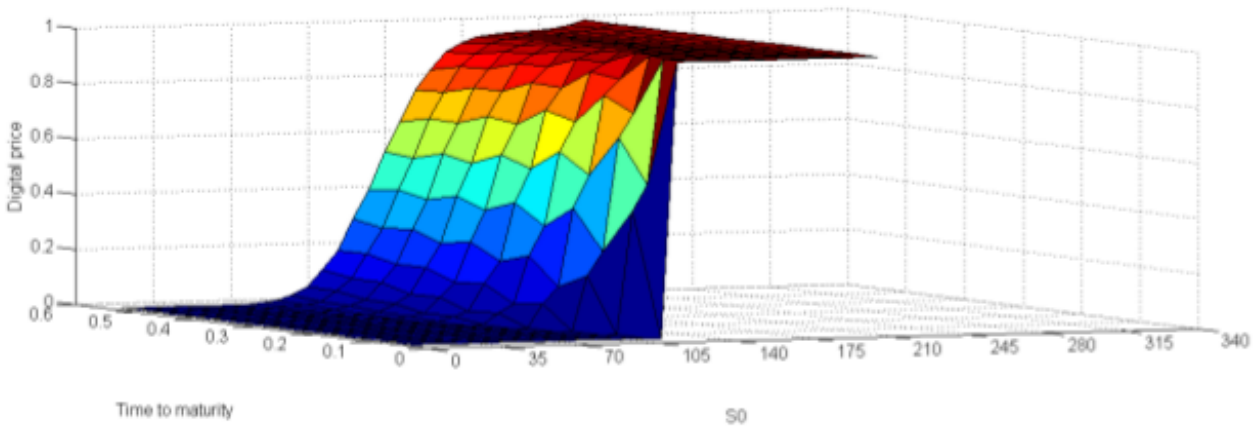


Figure: Pricing surface of a digital option.

Complex System Simulation.

- Learning about complex (social) networks.
- Studying chaotic behavior.

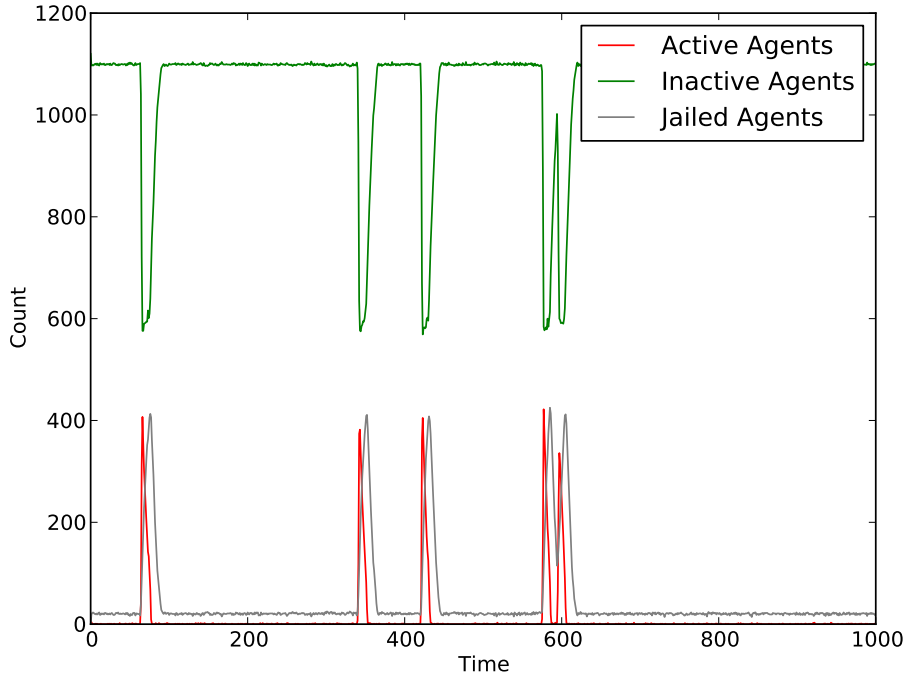


Figure: Rebel-cop interaction on a grid.

Scientific Visualization.

- Studying about visualization methods used in scientific literature.
- Comparing visualization tools.

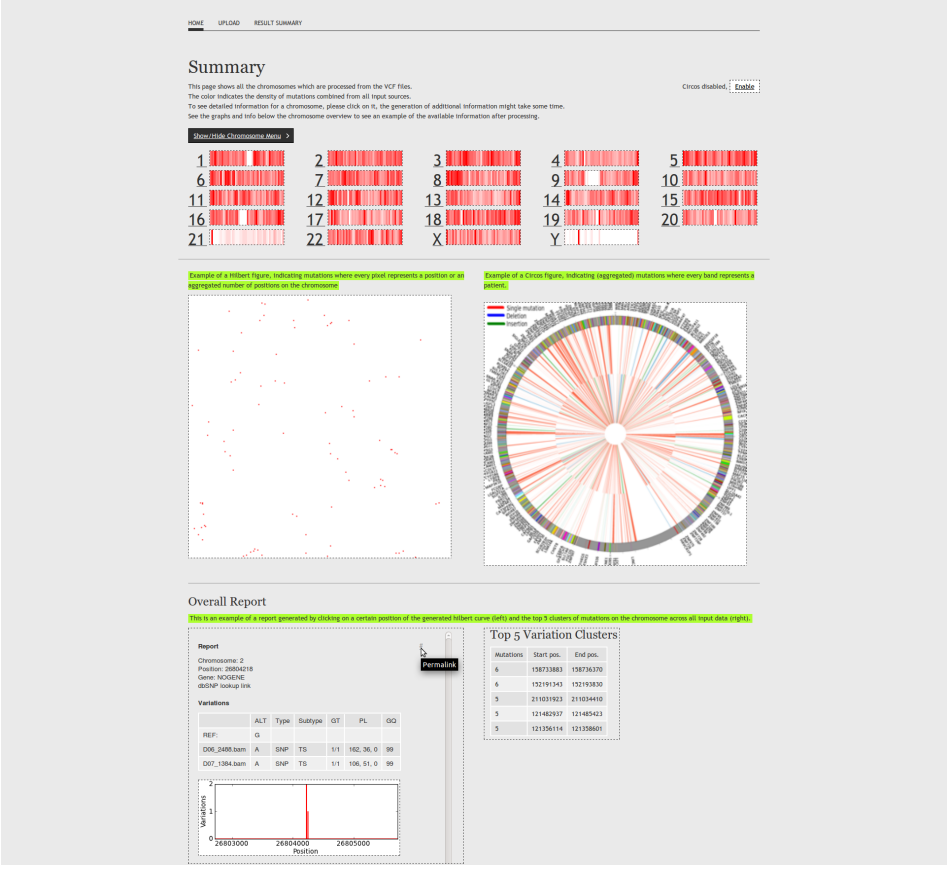
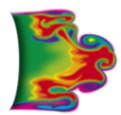


Figure: DNAViewer: an interactive webpage for displaying mutation data.

My Master Thesis.

- Currently doing my master project at ING.
- Topic: Pricing and hedging of Single Premium Variable Annuities (SPVA's).
- Computational finance uses many principles from physics, e.g.:

$$\frac{\partial V}{\partial t} + \frac{1}{2}\sigma^2 S^2 \frac{\partial^2 V}{\partial S^2} + rS\frac{\partial V}{\partial S} - rV = 0$$



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Others.

- Iona Niculescu, Modeling cells in blood vessel systems, Comp. Science UvA.
- Louis Dijkstra: Dynamic social-economic networks, University of St. Petersburg.
- Cong Chen: Potts-model research, CWI.
- Alex Thiakos: Insurance-related development of pricing methods, ING.
- Lotte Huisman: Multi-scale modeling of calcification in scleractinian corals, Comp. Science UvA/James Cook University.
- Amir Masoud Abdol: Multi-objective optimization for modeling developmental gene regulatory networks, Comp. Science UvA/Centre for Regulatory Genomics Barcelona.

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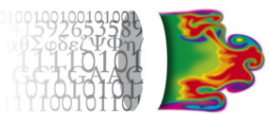
Thank you for your attention!

Questions?



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