Empirical Algorithmics

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From an interview Robert B. Laughlin (1998 Nobel prize in physics):

[Der Spiegel 1/2008, translation and markup by HH.]

SPIEGEL: Aren't the great success of physics based on the belief [...] that every phenomenon can be explained by laws, which in turn can be derived from more fundamental laws, until in the end one arrives at the 'universal formula'?

Laughlin: That is historically incorrect. Consider metallurgy, which is doubtlessly of enormous significance for our every-day life – for building cars, airplanes or [other] machines. And what does this science consist of? Of nothing but black magic. Over centuries, it has been developed into a really sophisticated art, but it is based on nothing but recipes [i.e., heuristics].

From an interview Robert B. Laughlin:

[Der Spiegel 1/2008, translation and markup by HH.]

SPIEGEL: In your opinion, is it the case that the role of deep understanding in all of physics is overestimated?

Laughlin: Not only in physics. Consider [the field of] medicine. There too, the really important steps of progress are often based on mere recipes of how to get well again ...

From an interview Robert B. Laughlin:

[Der Spiegel 1/2008, translation and markup by HH.]

Laughlin: I don't know which system of belief is best suited to achieve progress in science. But I know one thing for sure: Regardless of what you believe, in the end you have to ask yourself: Which experiment allows me to prove that my favorite idea is wrong? And only when that experiment fails, you have a chance to be right. And exactly this is [psychologically] difficult, because it is not uncommon that your career will depend on the correctness of your idea.

From an interview Robert B. Laughlin:

[Der Spiegel 1/2008, translation and markup by HH.]

[On the subject of falsification of results and fraud in science, asked whether this happens only in a very small part of the scientific community:]

Laughlin: Absolutely not. My personal experience tells me that we are dealing with a shockingly common phenomenon. And there are many ways to tell a lie. For example, it can be sufficient to make statements that are true, but irrelevant. There are loads of experiments that simply don't test what they pretend to test. Or you can pretend to have found what everyone already believes. That way you can be quite sure that no one will raise any doubts.

Course overview

- Module 1: Introduction
- Module 2: Deterministic algorithms for decision problems

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- Module 3: Randomised algorithms for decision problems
- Module 4: Algorithms with error for decision problems
- Module 5: Algorithms for optimisation problems
- Module 6: Advanced topics (time permitting)

Lecture schedule:

Tue, 3 June,	9:00–11:00	Room 210, III Irst	[Module 1]
Wed, 4 June,	9:00–11:00	Room 210, III Irst	[Module 1/2]
Thu, 5 June,	9:00–11:00	Room 210, III Irst	[Module 2]

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Tue, 10 June,	14:00–16:00	Room 210, III Irst	[Module 2]
Wed, 11 June,	9:00–11:00	Room 210, III Irst	[Module 2/3]
Thu, 12 June,	14:00–16:00	Room 210, III Irst	[Module 3]
Fri, 13 June,	14:00–16:00	Room 210, III Irst	[Module 4]

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Fri, 13 June,	14:00–16:00	Room 210, III Irst	[Module 4]
Tue, 24 June,	9:00–11:00	Room 210, III Irst	[Module 5]
Wed, 25 June,	9:00–11:00	Room 210, III Irst	[Module 5/6]
Fri, 27 June,	9:00–11:00	Room 210, III Irst	[Module 6]

Student assessment:

- 2 assignments, consisting of literature study, knowledge testing questions, some programming / hands-on problems; probably to be released around 5/12 June, due 12/19 June at the beginning of class, marked ∼13/26 June [∼40%]

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- in-class participation (possibly including short presentation) [∼20%]

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- Please ask questions, contribute your comments and ideas.