

# Industry versus academia?

## Learning and teaching programming

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**Teaching in the  
Industry in the  
90s....**

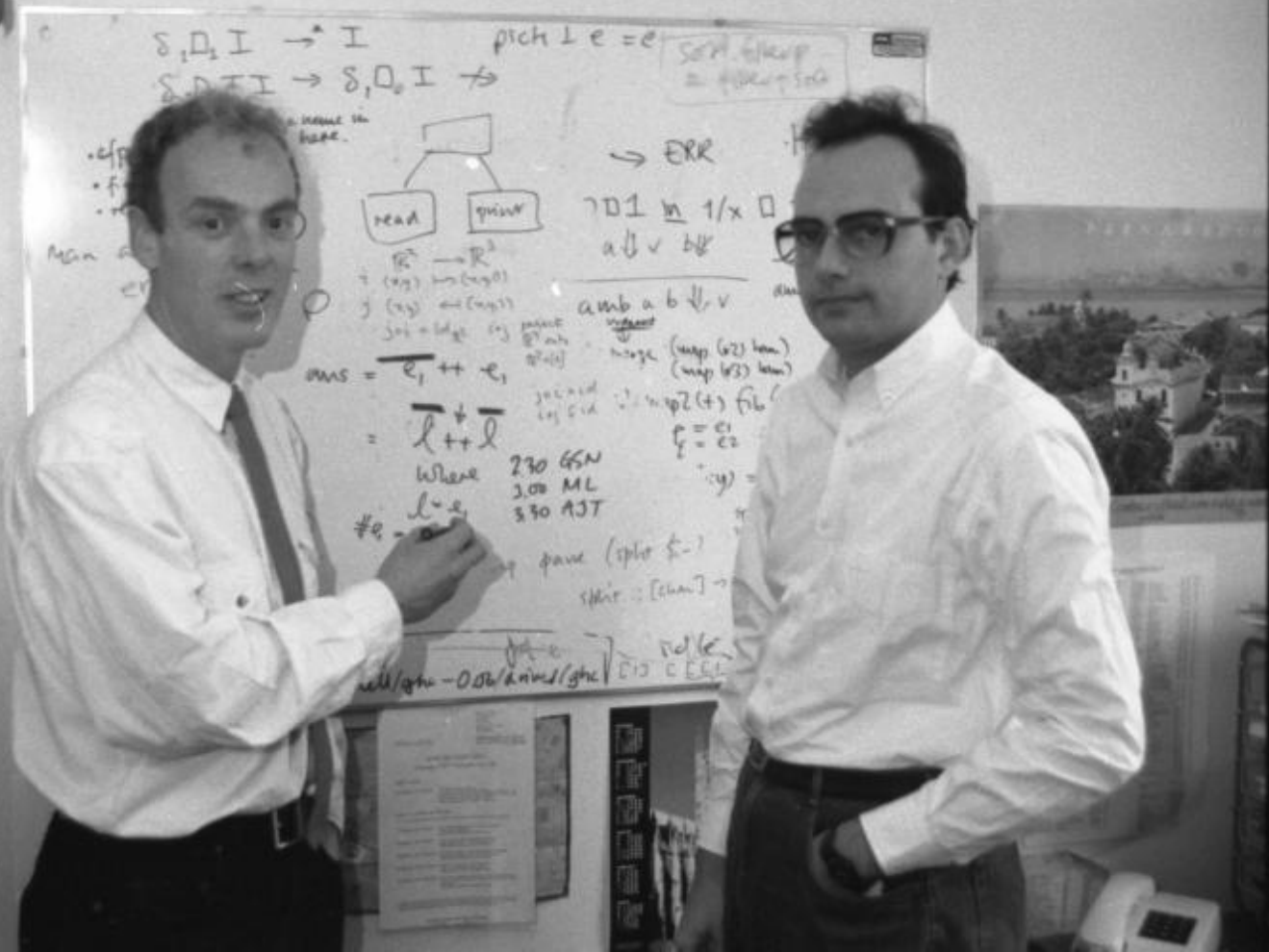


**ERICSSON**

UFPE, Recife,  
Brazil. 1988

Functional  
programming  
in SML ... on a  
mainframe.

A type theory  
course that  
became my first  
book.



Is Erlang any good  
for ASCII art?

```

. . . . . ## . . . . . ## . . .
. . . . ## . # . . . . ## . # .
. . ## . . . # . . . ## . . . # .
. # . . . . # . . # . . . . # .
. # . . # . . # . . # . . # .
. # . . ### . # . . # . . ### . # .
. # . . # . ## . # . . # . ## .
. # . . # . . . . # . . # . . .
. . # . . # . . . . # . . # . .
. . . # . # . . . . # . . # . .
. . . # . # . . . . # . # . . .
. . . . # . # . . . . # . # . .
. . . . ## . . . . . ## . . .
. . . . . ## . . . . .
```

In Universities,  
students are there  
to learn how to learn!

In Universities,  
students are there  
to learn how to learn!

In Industry,  
students are there  
to learn how to do stuff!



VS



# Follow through

*Programming Language  
Technology.*

Projects, reading,  
extending, embedding.

Confer like it's 1999 ...





Proof?





elixir



ERLANG

Top Down  
Vs  
Bottom Up



Erlang or Haskell or ...

Unexpected “;” on line 4

Real or “teaching” language?

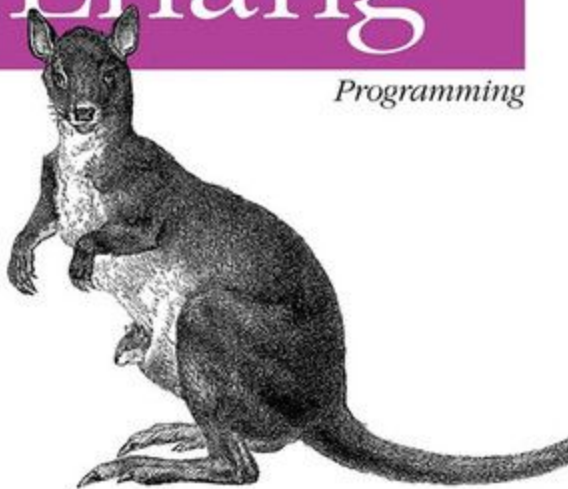
Oh for subsets!



*A Concurrent Approach to Software Development*

# Erlang

*Programming*



O'REILLY\*

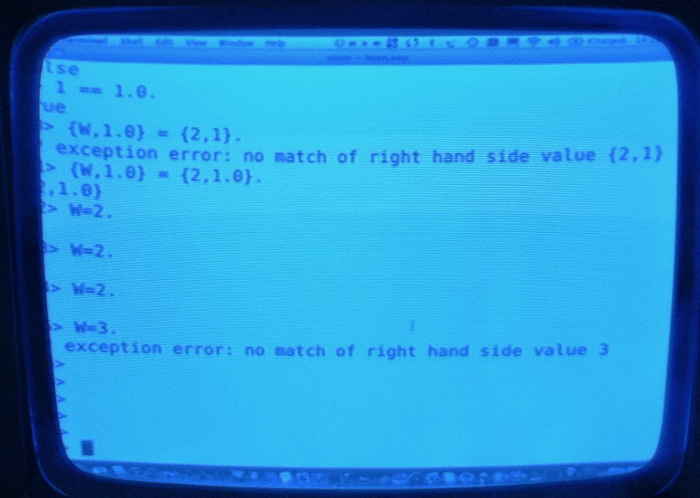
*Francesco Cesarini  
& Simon Thompson*



# 'Autocue'

Knowledge  
Transfer  
Partnership

Erlang Solutions,  
University of  
Kent, 2011.





“Beacon Project”

University of  
Kent’s fiftieth  
anniversary 2015.









FutureLearn  
MOOCs

Functional and  
Concurrent  
Programming  
in Erlang

Reach and  
volume



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University of  
**Kent**

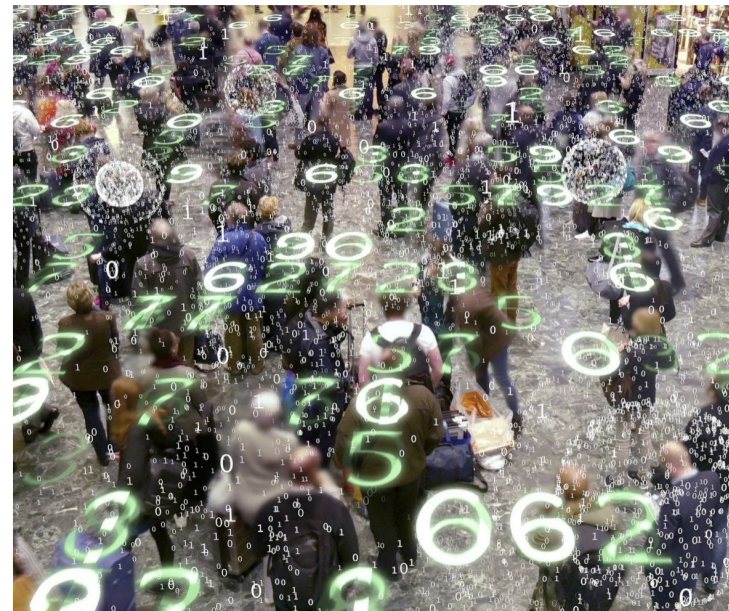
## Functional Programming in Erlang

★★★★☆ 4.6 (8 reviews)

Learn the theory and practice of functional programming in Erlang, through practical exercises and suggested projects.

[Go to course](#)

8,500 enrolled on this course



Duration  
4 weeks



Weekly study  
5 hours

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# Planning

Georgia Tech  
Mike McCracken

Software  
Engineering MSc  
programmes  
... academic vs  
industry cohorts.

Week	2	
Section	2.1	Getting started with lists
Component	2.1.5	Defining functions over lists
LOs	To deploy the recursion template of the previous section to make recursive definitions.  To modify the template in appropriate ways to define particular functions.	
Type	homework	
Time	20 minutes	
Content	<p>Exercises to reinforce ...</p> <ul style="list-style-type: none"><li>• <b>product</b> of a list of numbers</li><li>• <b>maximum</b> of a list ... start at <b>[X]</b>; remember can use <b>max</b> as well as computing the maximum of two values “by hand”.</li></ul> <p>Exercises to stretch ...</p> <ul style="list-style-type: none"><li>• defining the list <b>span/2</b> giving <b>[M,M+1, ..., N]</b>.</li><li>• picking out the even numbers in a list</li></ul>	
Additional material	Could have an optional exercise sheet and video about list comprehensions ... not essential but a nice piece of notation which is useful in some examples like quicksort. Hmm ...	
Notes		
Transition	Let's see how the solutions to this work out.	

Media tech

“Good enough”  
is good enough.

Lights!

Microphone?





Social learning

FL approach.

Huge potential  
beyond  
programming 101



Interaction  
tech

Multiple  
modalities

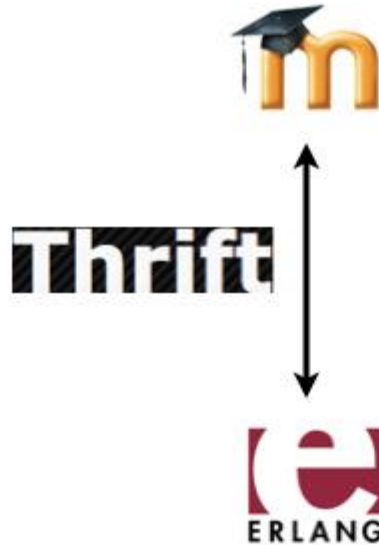
# Let's not re-invent the wheel!

- Compiler
- Dialyzer
- Wrangler
- EUnit
- QuickCheck / PropEr
- Tracer

Interaction  
tech

Multiple  
modalities

# Behind the Scenes



```
$ft = new Feedbacktool();  
$job = new FTJob();  
[...]  
$job_id = $ft->compute($job);
```

```
compute(Job) ->  
[...]  
JobId.
```

# Things fail... ... so do automatic tools

Interaction  
tech

Multiple  
modalities

- Manually monitor selection of solutions
  - Identify common error patterns
  - Incrementally improve automatic feedback
- “Ask the teacher” button
- Traditional forums

Interaction  
tech

Multiple  
modalities

# The Teacher's Perspective

- Invent an exercise (or use an existing one)
- Write a solution for it
- Write tests for your solution
- Plug it into the Feedback Tool
- Configure



## Motivation



# If MOOCs cost so much more than a normal course, why do it?

Economics

[slide courtesy  
of Mike  
McCracken]

- Economic benefits
- Branding benefits
- An approach to getting faculty truly interested in improving their teaching and trying new technologies and methods in a “controlled” environment with measurable outcomes
- Do you trust others to tell you how, what, why?

Fun!







/Fay-lee-nuh/

@Felienne

Just did the first online live session for Psychology of Programming and you know what? It was actually kind of fun and nice! Discussed homework and used breakout rooms for deeper conversations in smaller groups. Not the same as a real lecture, of course, but not bad!

9:20am · 8 Feb 2021 · Twitter Web App

1 Reply 1 Retweet 1 Like



Reply to @Felienne

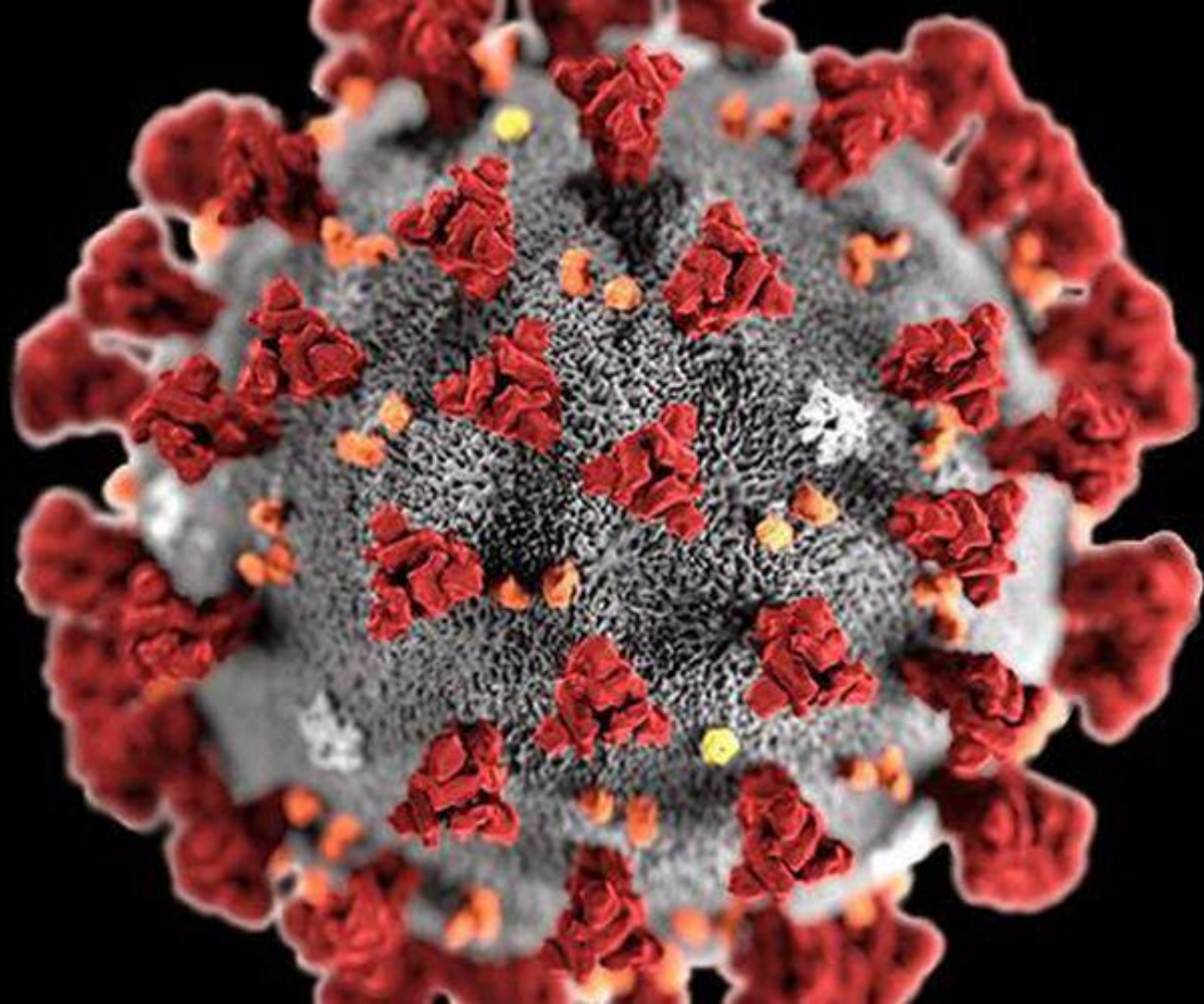


/Fay-lee-nuh/ @Felienne

1m

Not sure if I am getting better at moderating or students are getting more excited about participating online?





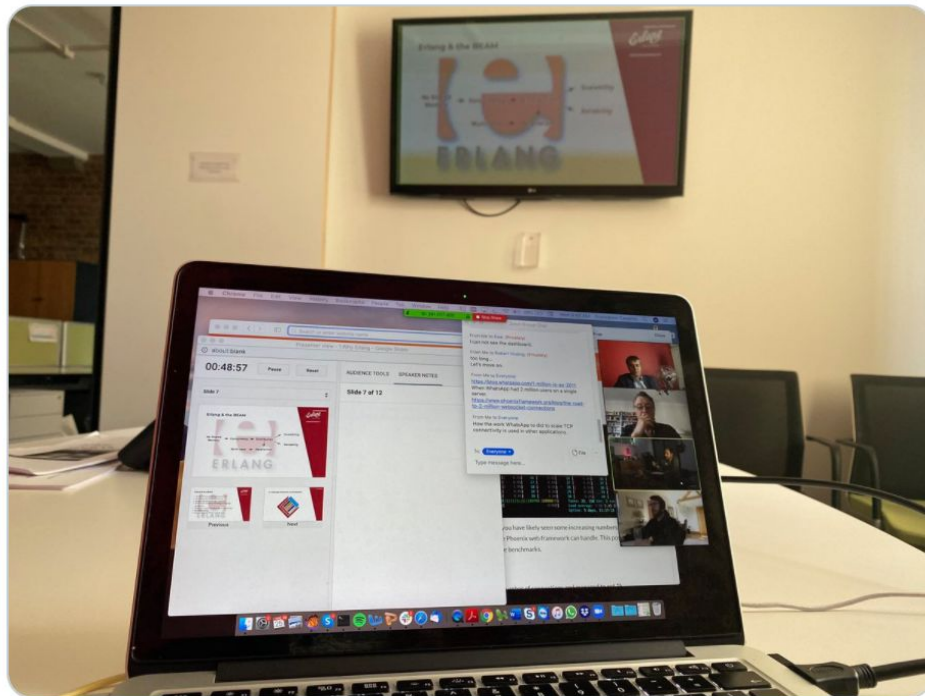




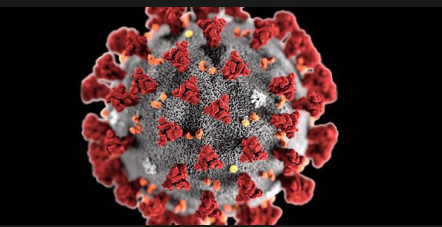
**Francesco Cesarini**  
@FrancescoC



Day 1 of remote training. Why Erlang? Current view.  
Chuffed to have the one and only @samaaron on the  
course!



10:24 AM · Mar 25, 2020 · Twitter for iPhone



Top Down vs Bottom Up

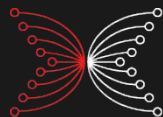
Interactive tech vs sociability

Synchronous vs asynchronous

Pure online vs blended

Shared resources vs “not invented here”

Textbooks as a community resource?



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