

A Tour of Dafny

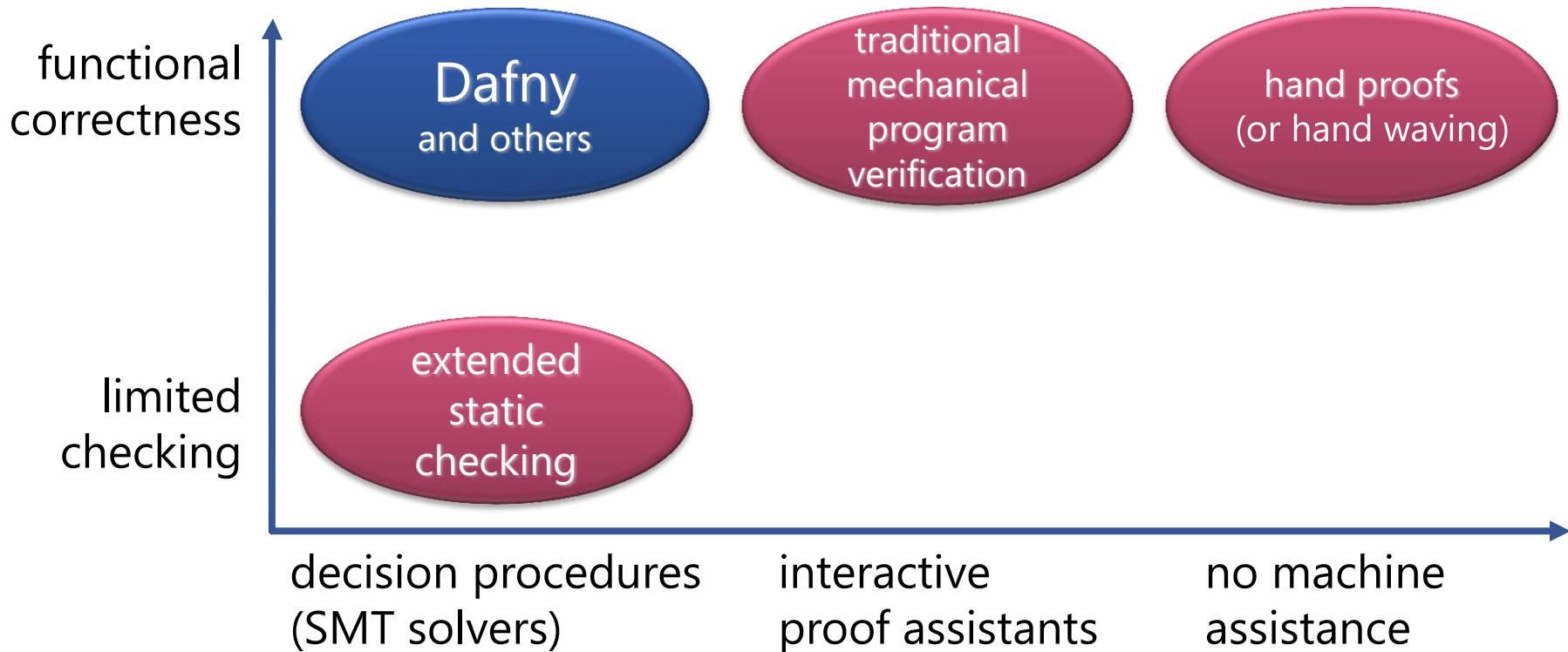
K. Rustan M. Leino
Principal Researcher
Microsoft Research

Reasoning about programs

- Central to any programming task
 - From safety critical applications to scripting
 - From initial development to maintenance to debugging
- Minimizes faults, security problems, time/cost to market
- Thinking skill

- How do we teach?

Program verification



Dafny

- Object-based language
 - generic classes, no subclassing
 - object references, dynamic allocation
 - sequential control
- Built-in specifications
 - pre- and postconditions
 - framing
 - loop invariants, inline assertions
 - termination
- Specification support
 - Sets, sequences, inductive datatypes, ...
 - User-defined recursive functions
 - Ghost variables



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DEMO

Dafny

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Use tools without installation



The screenshot shows a web browser window with the URL `http://rise4fun.com/Dafny`. The page title is "Dafny @ RiSE4fun - A langu...". The main heading is "RiSE4fun" in a large, bold, black font. Below the heading, there is a sub-heading "gave 58,782 answers!" and a prompt "Click on a tool to Load a sample then ask!". A row of buttons includes "agl", "bek", "boogie", "code contracts", "concurrent revisions", "dafny" (highlighted in blue), "esm", "fine", "heapdbg", and "poirot". Below this row, there is a code editor with the following Dafny code:

```
method Main() {  
  print "hello, Dafny\n";  
  assert 10 < 2;  
}
```

Below the code editor, there is a black button labeled "ask dafny" and a text prompt: "Is this program correct? Click 'ask dafny'! Read more or watch the video." To the right of the prompt, there are social media sharing buttons for "Tweet" and "Like" (with a count of 122). At the bottom of the page, there are navigation links: "explore", "projects", "live", "permalink", "developer", and "about". The footer contains the text "© 2011 Microsoft Corporation - Terms of Use - Privacy" and the "Microsoft Research" logo.

References

- Tools:
 - Dafny: research.microsoft.com/dafny
 - Spec#: research.microsoft.com/specsharp
 - VCC: research.microsoft.com/vcc
- Tools in browser:
 - [Rise4fun.com](https://rise4fun.com)
- Verification Corner (videos on verification)
 - research.microsoft.com/verificationcorner



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