



NSF Forum on Future Directions for
Design Automation Research

Increased Diversity: Position Statement

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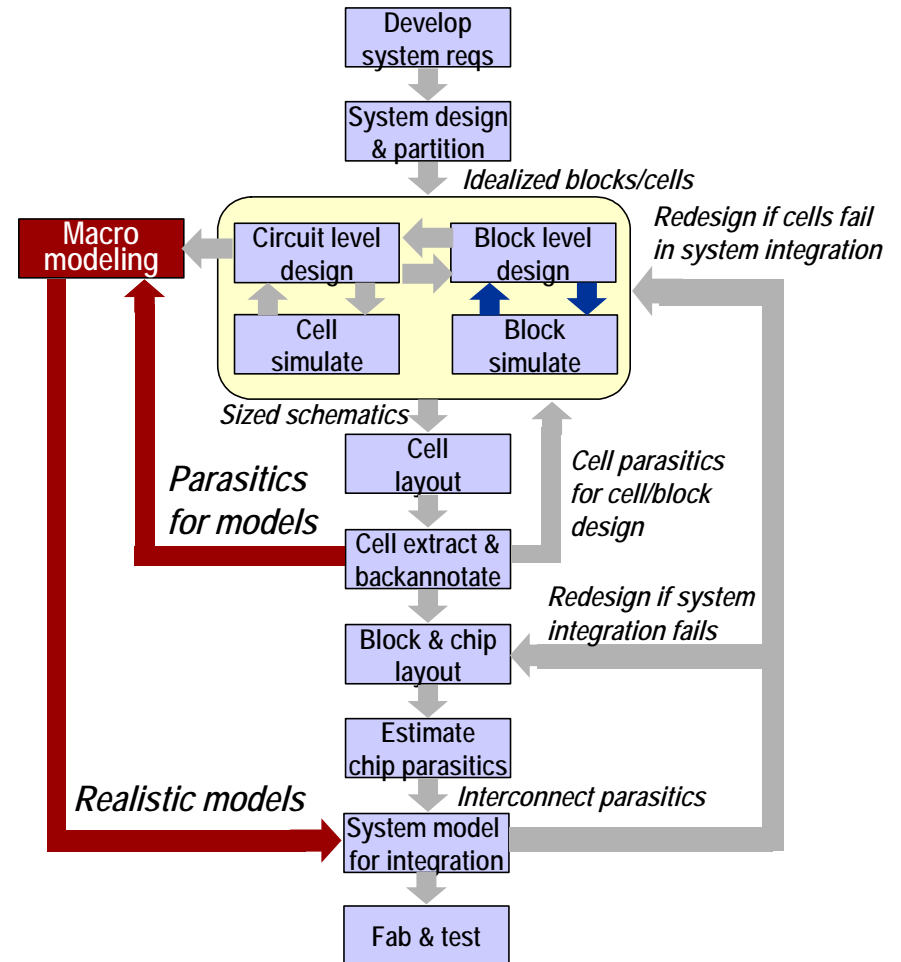
Goal: Design Flows for NonDigital that look like Digital

■ Rutenbar's Rule:

- "Everybody who starts out working on analog optimization, ends up working on constraint management, variability, modeling, flows, etc

■ Why

- As we get optimization methods that are increasingly *practical*...
- ...we want more tools to automatically *abstract* circuits
- ...we expose *weaknesses* at all levels of today's standard analog, RF and mixed-signal flows



My “Top 5” Significant Challenges / Roadblocks

■ Scale

- We have good tools for 100-transistor circuits today; but we can't do 10,000 analog devices. We no longer want to just build opamps. Need to target whole systems.

■ Variability

- It's bad for digital, it's worse for analog: we exploit more low-level physics. How to analyze, verify, incorporate into optimization?:

■ Architecture

- Tomorrow's mixed-signal circuits will be less “pure” analog, more digital correction, more regular design strategies, etc: What do this do to our tools?

■ Modeling

- Robust extraction is vital for optimization, for verification, and for getting novel “post-Si” technologies to circuits folks. Today's tools are terribly *ad hoc*. We can do better.

■ Usability

- My PC desktop doesn't look the same as it did 10 years ago. So, why does my circuit design environment? If we don't get this right, tomorrow's flood of design constraints could be a surprising show-stopper.