

The Unknown Journey of Academics

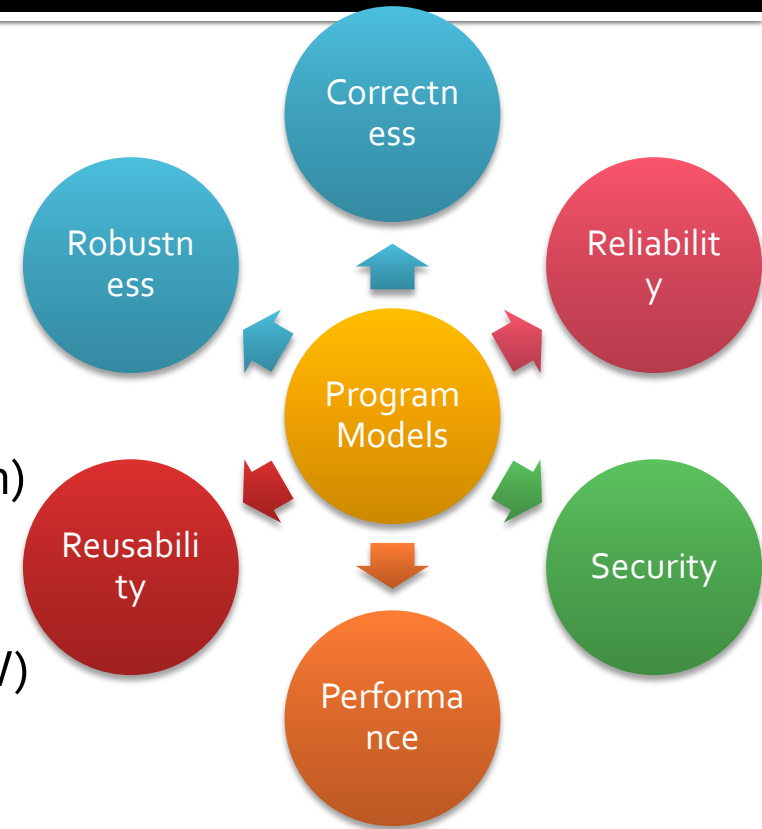
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About me

- LIU, Yang
- Bachelor in SoC under SM3 (2001 – 2005)
- Ph.D. in Soc (2006 to 2010)
 - Supervised by Prof Jinsong Dong
- Research Scientist in Temasek Lab (2011 to 2012)
- Nanyang Assistant Professor in NTU (2012- 2017)
- Associate Professor and Director of Cybersecurity Lab

Research Interests

- Formal Methods
 - Modeling: concurrency, real-time, probability
 - Verification algorithms and reduction
 - Applications: CPS, Multi-agents...
- Security
 - Security protocol (Design and Implementation)
 - Security by design (HW, OS, AV/Drones)
 - Malware modeling and detection (SW vs HW)
 - Security policy runtime monitoring (SW vs HW)
 - Binary analysis: vulnerability, patch and RE
- Software Engineering
 - maintenance, debugging, reliability, performance, testing
- Program Analysis
 - Loops analysis, invariant, termination, resource analysis



**How to prepare yourself for a
faculty position?**

My own story

- Bachelor in SoC
 - 2001 - 2005



Bachelor



School of Computing

- First Class and 2nd best graduates among 800+ undergraduates

Tata Consultancy Services Asia Pacific Medal and Prize

2004-05 Liu Yang

Cross Road?



School of Computing



The Pain and Gain in Ph.D.

- Lucky summer of 2005
- Painful start and lost
- Turning point of year 3
- Happy ending with a degree



PhD

Cross Road?



Happy days in the Post Doc

- Building our PAT tools
 - Peer programming
 - Peer paper writing
- Playing basket balls
- Traveling all over the world
- Wider collaborations and (co-)supervising ph.d. students



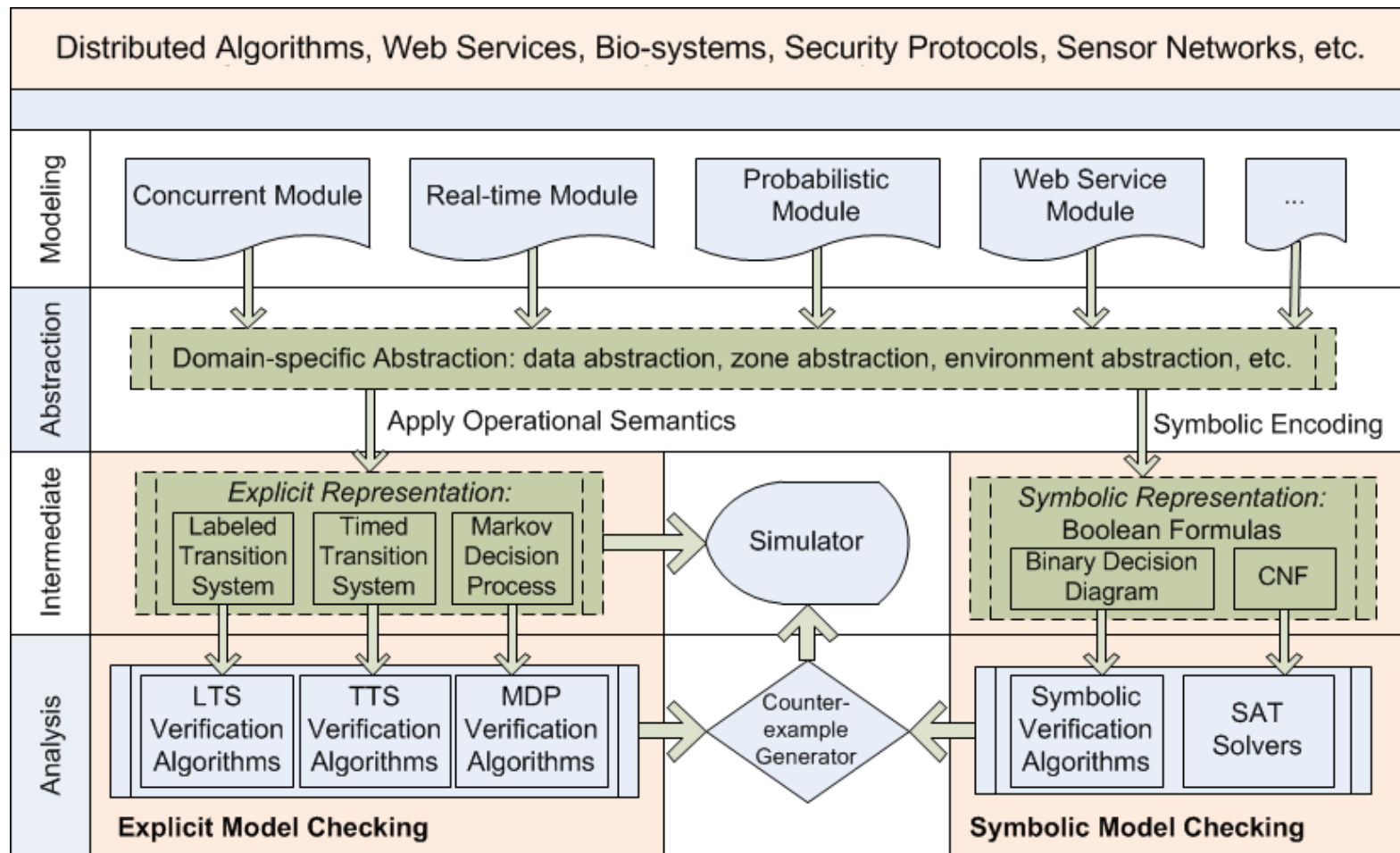
Faculty Application in 2012

- My CV at that time
- Research:
 - 10 journal papers
 - 50 conference papers
 - ~10 top tier conferences or journals
 - 1 research tool with 3000 users
- Teaching
 - Some guest lecturers and tutorials in conference
- Service
 - Some conference PCs

PAT (Process Analysis Toolkit)

www.patroot.com

- An self-contained framework to support the development of formal verification tools



How to find a faculty job?



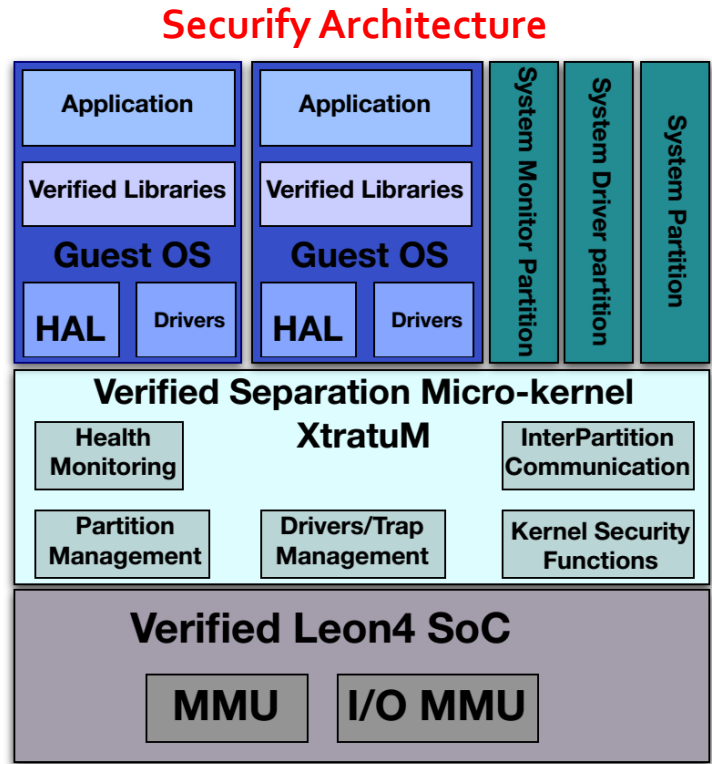
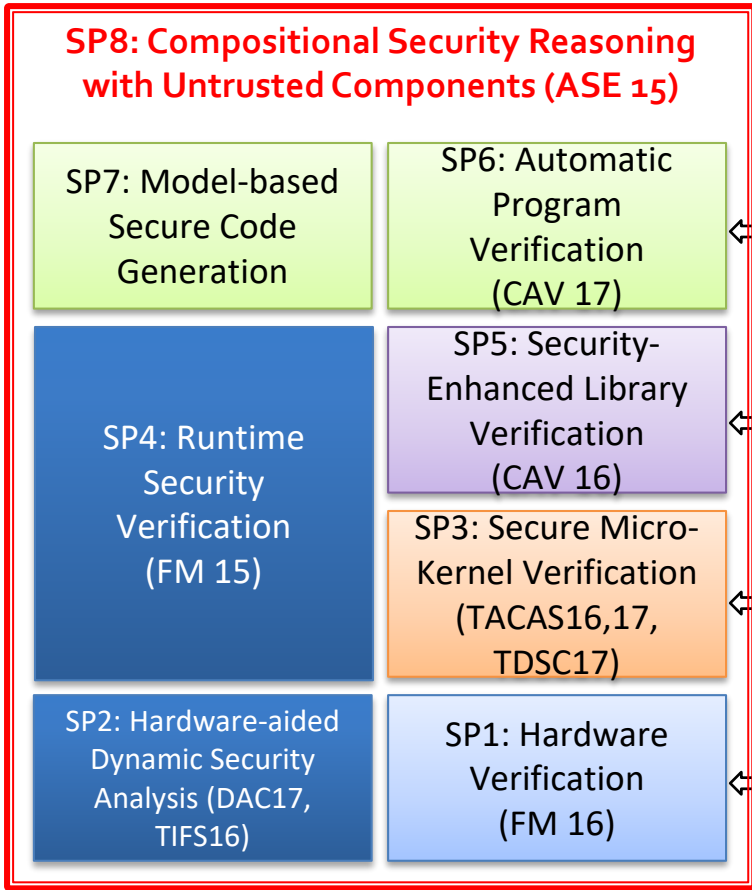
1. Prepare your CV

- Try to increase the number
 - Work harder
 - Actively to look for more collaborations
 - Journals?
- Try to increase the quality
 - Aim high
 - Work with the right mentor and team
- Try to make impact
 - (Open source) tools and data sets
 - Proposing new research directions
 - Theoretical breakthrough
 - Commercialisations and adoption
- Experience (teaching, PC, supervision, writing grants)
- Network and collaborations

2. Connect your research and have a promising global view

- Bad research presentation
 - Top conference papers:
 - xxx
 - xxx
 - xxx
 - Top journal papers:
 - xxx
 - xxx
 - Xxx
- Good research presentation
 - Strong motivation: important research directions and exciting
 - Connected in a global view
 - Long term view (how you will change the world)

Securify: A Compositional Approach of Building Security Verified System



3. Know the Game

- Hiring process:
 - Advertisement -> CV submission -> shortlist -> campus visit (technical talk, teaching talk, talk to faculties) -> final offer
- Fitness
 - “Fit” can mean everything from your area of research to what you teach to what a given school may need with respect to faculty demographics and diversity to such mercurial things as faculty personality.
- Do your homework:
 - Understand who is who
 - How to connect your research with existing faculties
 - Prepare for potential interview questions
 - Prepare smart questions
- Insider
 - Your friend and collaborators inside will be very helpful
- Plan B/Plan C?



How to survive as an assistant professor?

My own story of being an Assistant Professor in NTU

- Starting challenges
- New research directions
- Teaching new courses
- Research grants
- Student hiring and supervision
- Peer competition and even politics?



NTU SCSE Cyber Security Lab



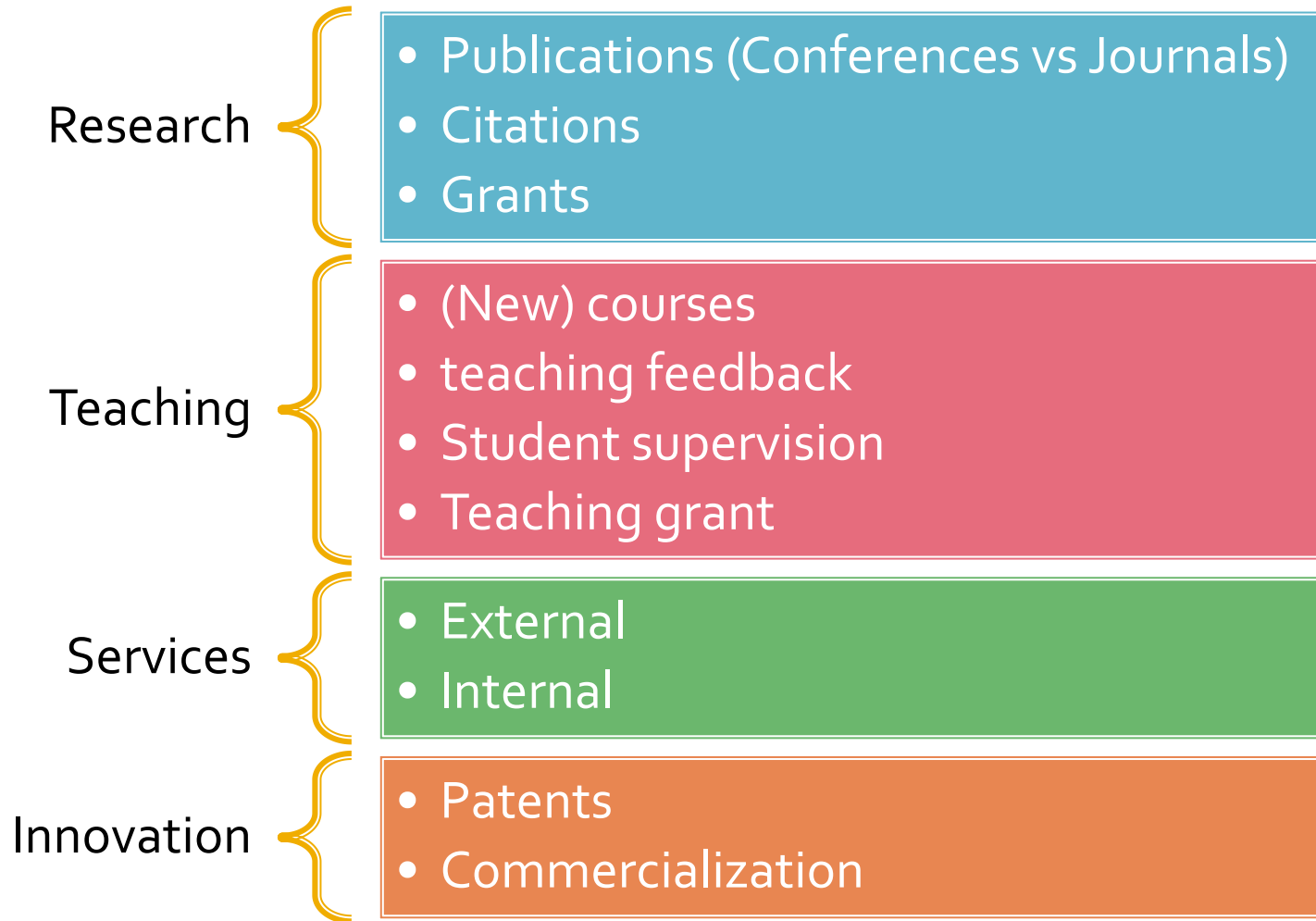
Security Research Team in NTU



How to survive as an assistant professor?



Know the expectations



Publication

- Aim for the high quality works always
- Balance the journal and conferences
- Too few vs. too many
- Build a profile with one direction and vision

Grants Applications

- Aware of the opportunities
- Keep Trying
- Know the people
- Follow the trend?

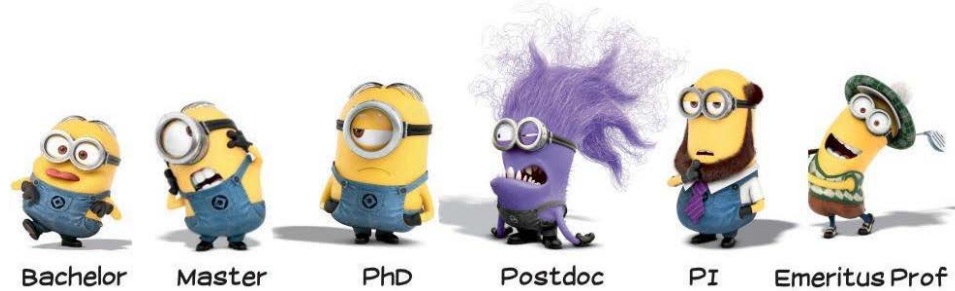
Student supervision and team building

- Get the good students
 - Where
 - How
- How to supervise?
 - Directions
 - Intensities
 - Personalities
 - Writing
- Build your team

Build your network and connections

- Getting alone with your colleagues
 - Become friends via meals and beers
 - Find your mentors
 - Publicities in your own school
- Building connection in the communities
 - Reference letters
 - Collaboration opportunities
 - PC opportunities
 - Good students and post docs recommendation
 - ...

Summary



- The journey is largely unknown and full of challenges
- Know the unknowns
 - How well is the research progress
 - Will the paper will accepted or rejected
 - Will I get the research grant
 - Whether can I fit into the environments
 - What are the popular research directions in the future
- Know the knowns
 - Understand the expectation of the faculty position and tenure criteria
 - Try to find good students to work with, and build your own team
 - Build your networks and collaborations, especially the in school
 - Active in your fields
 - Follow the trend rather than ignore it
 - Work hard and smart



FIND
YOUR
PASSION