



PhD from start to finish (almost)

Jonathan Wahlqvist (JW)
Brandteknik, LTH

Overview

- **Projects/research**
 - What needs to be done?
 - What needs to be learned?
- **Courses**
 - Help with projects, research and perhaps teaching?
- **Papers**
 - Condense projects/research and publish
- **Teaching**
 - Pass on knowledge to new students

Projects

- PRISME 1 & 2
 - Fire safety in nuclear power plants
 - Electrical fires
 - Pool fires
 - Mechanical ventilation

- NKS Poolfires
 - Learn more about pool fires
 - Pool fire experiments
 - Modeling of pool fires

Projects

- Key issues in both projects:
 - Modeling of pool fires
 - Radiative feedback
 - Oxygen depletion
 - Mechanical ventilation

What needs to be done?

- Mechanical ventilation
 - Brand new existing model in FDS, must be validated
- Pool fire model
 - Existing ones did not fit needs, implement new one in FDS (Fire Dynamics Simulator)
- Model interaction between fire and building – general problem

Courses – what is needed?

- Pool fire model
 - Implementation in FDS means programming, need to learn programming!
 - Initially learned Java, Matlab and some Fortran
- This is fun, what else?

More programming

- Virtual Reality is on the rise – use in fire safety engineering?
 - Learned game engine programming
 - C, C++, C#, JavaScript
- New path - will work more with VR, programming in FSE in future

Teaching

- Teach several courses
 - Computational fluid dynamics, FDS
 - Started with small part, now course responsible
 - Detection and suppression course
 - Supervising students in project
 - Sprinkler calculations (related to ventilation)
 - Fire safety assessment course
 - Ventilation calculations
 - Supervising CFD/FDS

Teaching

- Created new CFD part in fire dynamics course
 - First time this year – used all knowledge gained teaching other courses

Papers

- Validation of FDS in enclosure fires, novel measuring techniques using ps-LIDAR
- Validation of ventilation in FDS
- Implement new pool fire model in FDS, validate only model but also interaction with ventilation and building
- Two papers with engineering application of validated models

Finishing up

- Put all new knowledge and research in one place – the kappa
 - Create something that is interesting to read and reflects the research done
- Reflect on PhD process
 - What could have been done differently? What has been learnt?
- Think about what is next
 - Continue similar work – CFD/FDS
 - Do more VR/Programming

Finishing up

- Done!