





Singapore ETH Centre (SEC), CREATE Campus Vision

FCL Future Cities Laboratory	Phase I: 2010-2015		Phase II: 2015+	
FRS Future Resilient Systems		Phase I: 2013-207	18	Phase II: 2018+
FFS Future Food Security			Phase I: 2015-20	020



FUTURE CITIES LABORATORY

Switzerland 7 785 806 inhabitants

41 285 km²				
Singapore 5 183 700 inhabitants				

Switzerland - Singapore

Similarities

- Small, neutral countries amongst much larger neighbours
- Highly competitive economies, innovative
- Hubs for global talent

Differences

- Density
- Climate
- Culture
- Geographical / Economic "Hinterlands"
- \rightarrow Giving rise to new and exciting research challenges

Positive outcomes in the first 2 years

- Research results
- Industry and Government Agency partnerships and joint projects
- Growing cooperation with Singapore universities

712 km²

FUTURE CITIES LABORATORY

RESEARCH QUESTIONS

Which methods can increase the sustainable performance of cities?

How can we develop a new curriculum of urban science?







(SEC) SINGAPORE-ETH 新加坡-ETH CENTRE 研究中心 (FRS) FUTURE 未来 RESILIENT SYSTEMS 科学

System identification



(SEC) SINGAPORE-ETH 新加坡-ETH CENTRE 研究中心 (FRS) FUTURE 未来 RESILIENT 风险管理 SYSTEMS 科学



Building Bridges to Industry, Government Agencies, Universities

Link research to real world applications
Meaningful projects
Exchange of knowledge and ideas



FUTURE RESILIENT SYSTEMS

MOTIVATION

Risks faced by modern/vibrant societies are systemic; they do not neatly conform to traditional sectors, disciplines and national boundaries.

Extreme events are not exceptional - regarded as predictable.

FRS researchers strive to be proactive and <u>"trans-silo</u>", recognizing dense interdependencies and complex phenomena.

FRS philosophy recognises the inadequacy of simple approaches and causal stories, looking instead for a web of forces, intermittent feedbacks, use of massive databases and ultimately new frameworks and strategies to manage risk.



Create an integrated scientific framework that can model, communicate, predict, manage, and overcome risks in complex and highly interdependent systems

Develop methods and tools for decision makers, drawing from work in mathematical modelling, computer simulations, field studies, data mining, online research and laboratory experiments

Promote interconnections with industry, government and other research centres



FUTURE RESILIENT SYSTEMS

Interdependent Critical Infrastructure Systems

- Understanding Interdependencies
- Infrastructure Systems Modelling
- Characterization of Disruptive Events
- Smart Policies and Tactics to Optimize Systems

Energy Systems and Comparative Assessment

- Assessing and Measuring Energy System Resilience
- People and Operations in Resilient Systems

Social & Behavioural Factors

- Human Decision Making in Risky, Dynamic and Complex Environments
- Making Energy Demand More Sustainable and Resilient
- Ethnic Power Relations and Conflict in South East Asia

ETH Zurich Prof. Wolfgang Kroeger

Partners: NUS (lead: Prof. HO Teck Hua) NTU (lead: Prof. Michael KHOR) DSO EMA NEA WDA CSF