## Computational Laboratory for Life-cycle Structural Engineering

The room A140 in Imbt Laboratories is dedicated to the Computational Laboratory for Life-Cycle Structural Engineering, established in 2006. It consists of:

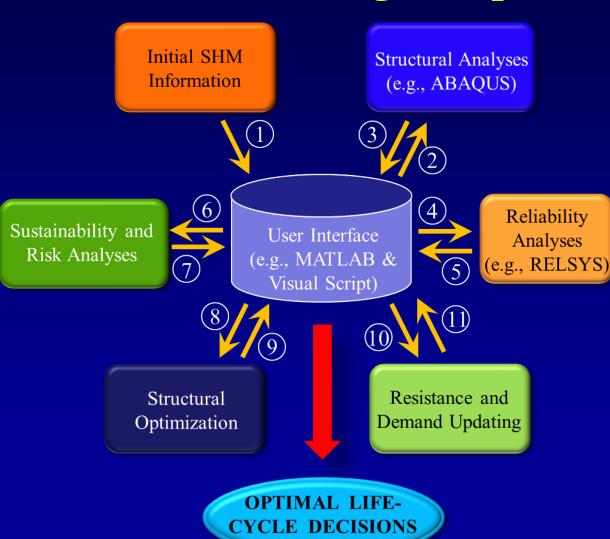
- Six Dell OptiPlex 7050MFF main desktops equipped with Core i7-7700T 2.9 GHz (up to 3.8 GHz) quad core processors, 16 GB of memory, and 512 GB SSD hard drives.
- Quad core (Intel Core i7-7700T @ 2.9 GHz) desktop serving for meetings and presentation purposes.
- One rack-type life-cycle computational server which are capable of speedily performing heavy-duty computational tasks
- Dell PowerEdge 730xd, Dual Intel Xeon E5-2670 v3 (12-core) at 2.3GHz,30M Cache, 128GB memory, 2TB storage, dual redundant power supplies.
- Dell Precision R5500n, Dual Intel Xeon X5675 (6-core) at 3.06 GHz, 24 GB DDR3 Memory, Dual 256 MB NVIDIA Quadro graphics card, dual redundant power supply, and two 500 GB-7200 RPM hard drives.

The interaction among the computational tasks used in life-cycle analysis/prediction and the integrated life-cycle management framework are presented next.





## **Interaction among Computational Tasks**

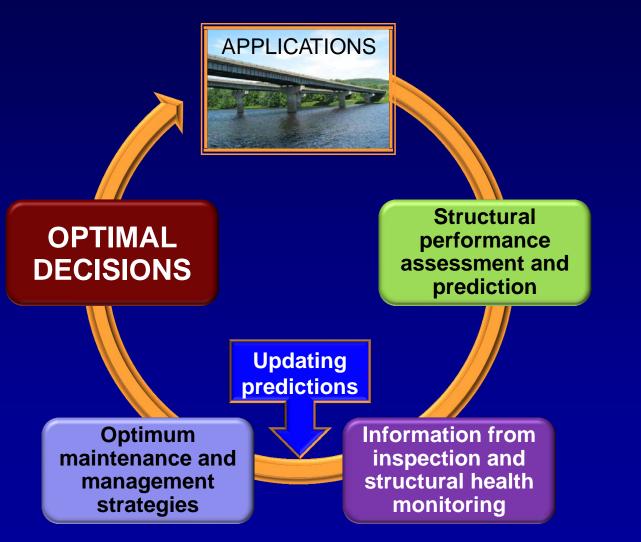


- Initial Structural Responses and Load Effects
- 2 Structural Properties
- 3) Internal Forces and Responses
- Limit States and Probabilistic Parameters
- Structural Reliability and Probability of Failure
- 6 Probability of Failure
- 7 Sustainability Assessment
  - Structural Performance
- 8 Profiles and Inspection /
  Monitoring / Maintenance
  Parameters
  - Optimal Inspection /
- Monitoring / Maintenance Schedules
- 10 Information From Future Inspection / Monitoring
- (11) Updated Parameters





## Life-cycle Management Framework



Life cycle cost and performance analysis

Sustainability

Resilience

Risk

Reliability

**Optimization** 



