

# System Dynamics Lab

연구실 소개 자료

백 승 훈



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Biography



Real-Time  
Dynamic Simulation



Advanced  
Physics Simulation



Dynamic  
Substructuring

## Mechanical System Design

백승훈 / Seunghun Baek



### ■ Education

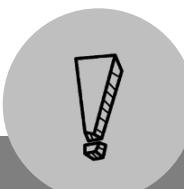
- 2016, Ph.D., Mechanical Engineering, University of Michigan
- 2011, MS, Mechanical Engineering, University of Michigan
- 2009, BS, Mechanical Engineering, Yonsei University

### ■ Experiences

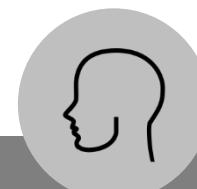
- 2016~2020, Research Engineer, Ford Motor Company, USA
- 2015, Intern, Sandia National Lab., USA

### ■ Contact Info

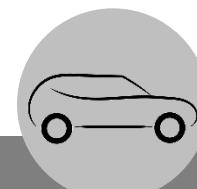
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- 기계관 613호 / 051)510-2314



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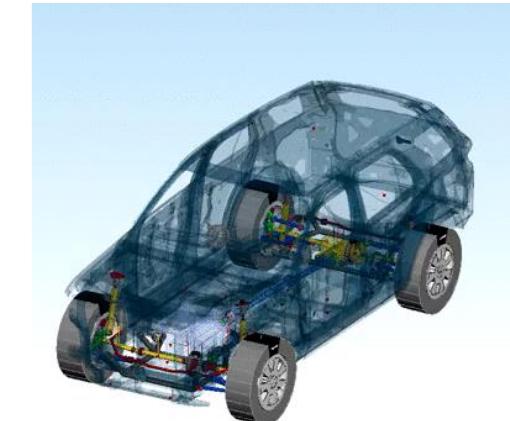
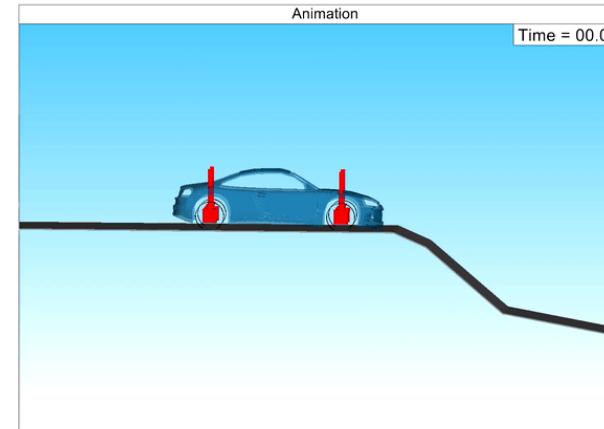
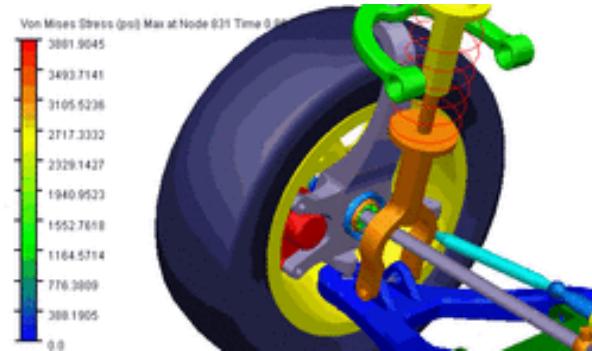
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## #1 High-fidelity Real-time Dynamic Simulation

- Multibody Dynamics를 이용한 동역학 해석
- Real-time simulation을 위한 High-fidelity 동역학 해석 모델 개발
- High-fidelity를 만족하기 위한 효과적인 Degree-of-freedom reduction 방법 개발



High-fidelity

O

Real-time

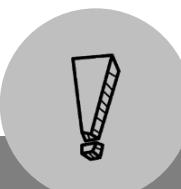
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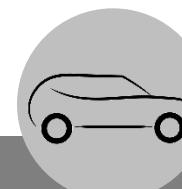
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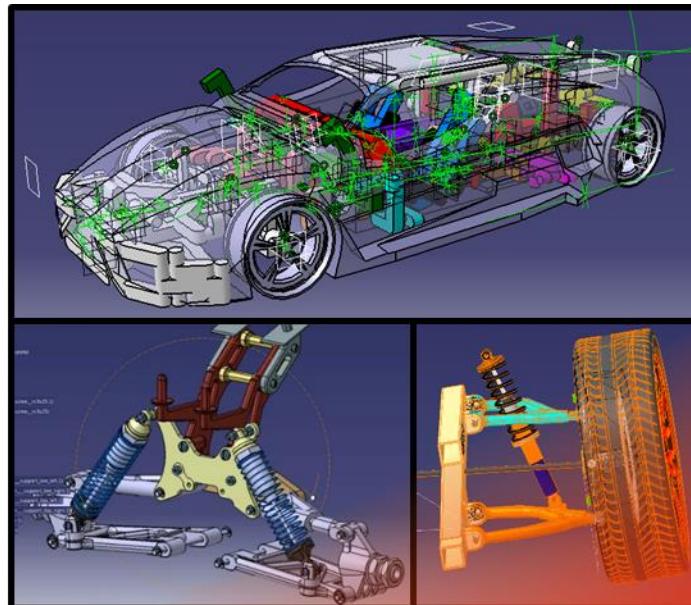


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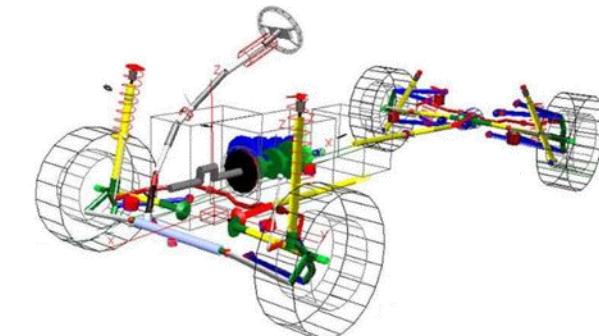
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## #2 Model Reduction

- Real-time application을 위한 system size reduction
- Modeling의 정확도를 높이기 위한 adaptive parametric study 방법 개발



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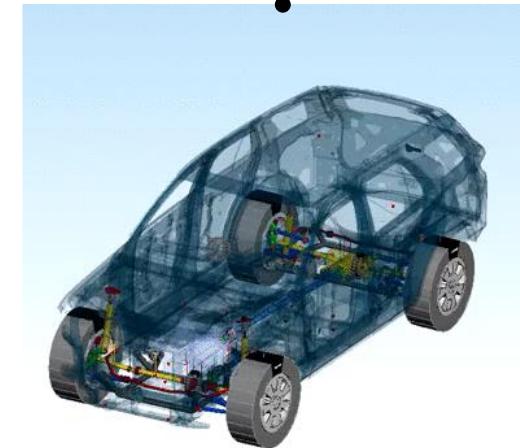
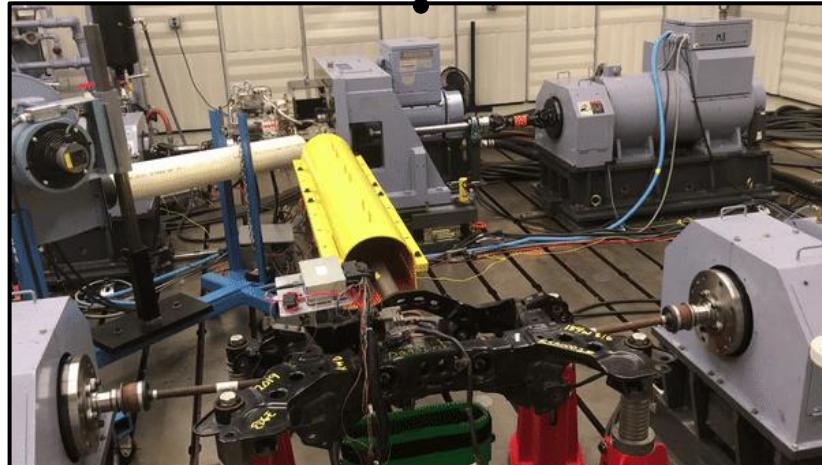
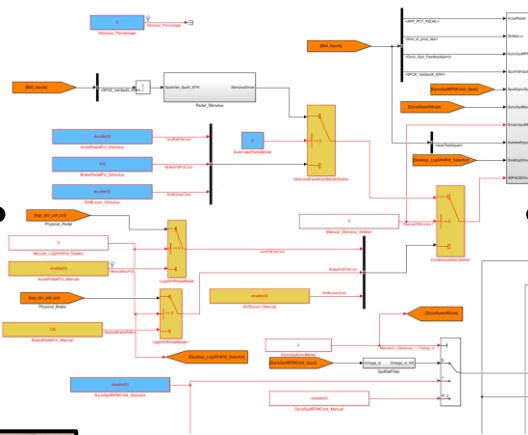
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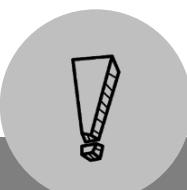


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## #3 Hardware-in-Loop (HiL) Simulation Tests

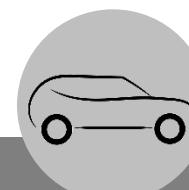
- Hardware와 simulation을 연동한 테스트 방법 설계
- 전기차 테스트를 위한 HiL platform 개발



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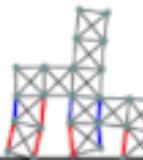
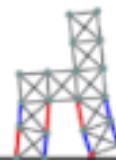
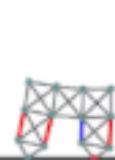
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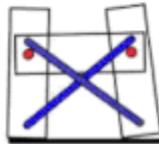


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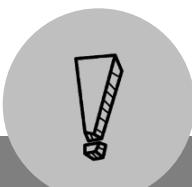
## #1 Differentiable Mass-Spring Simulator

- Python programming을 이용한 Dynamic FEM simulator 구현
- 구조체의 adaptive optimization 알고리즘 개발

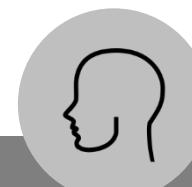


## #2 Differentiable Rigid Body Simulator

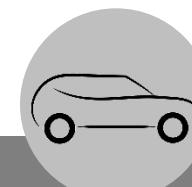
- Python programming을 이용한 multi-body dynamics simulator 구현
- Contact과 collision 을 포함한 dynamics simulator 개발



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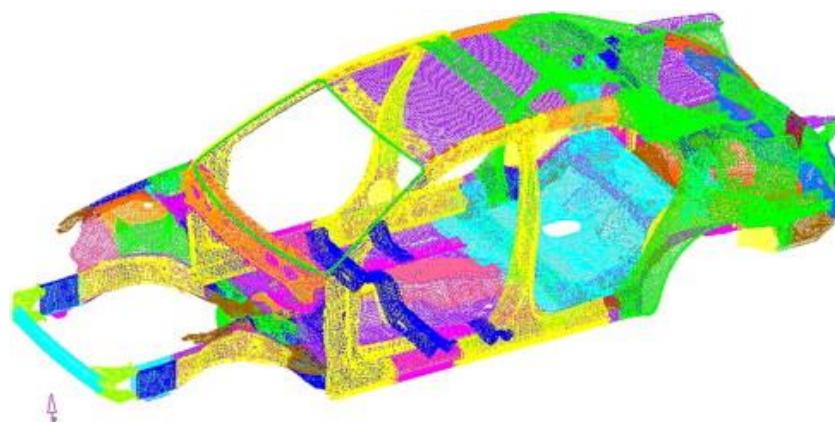
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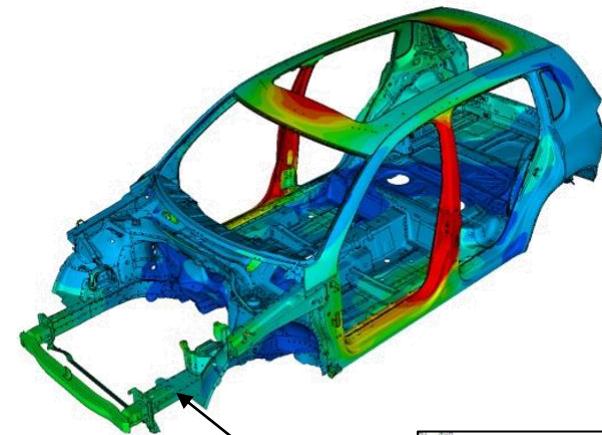


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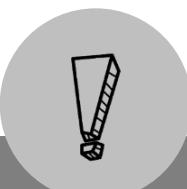
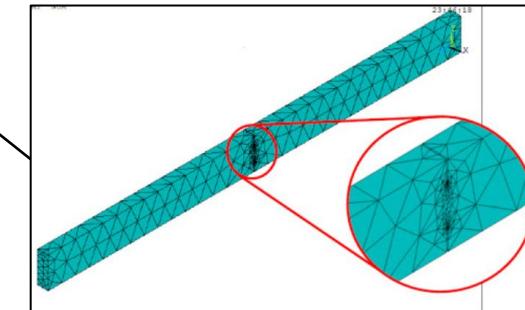
## #1 High-fidelity structural analysis

- Finite Element Method (FEM)을 이용한 구조체 해석
- Friction과 contact를 포함한 문제의 빠른 simulation을 구현하기 위한 해석 방법 개발

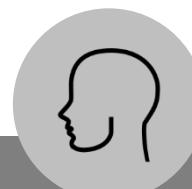


## #2 Crack detection

- 구조물의 균열 해석
- 균열 모니터링 및 조기 발견 방법 개발



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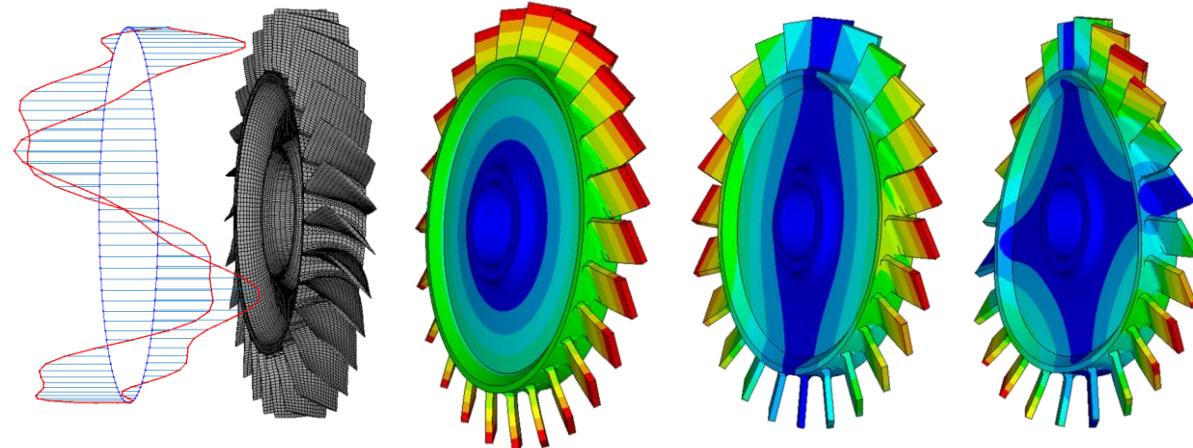
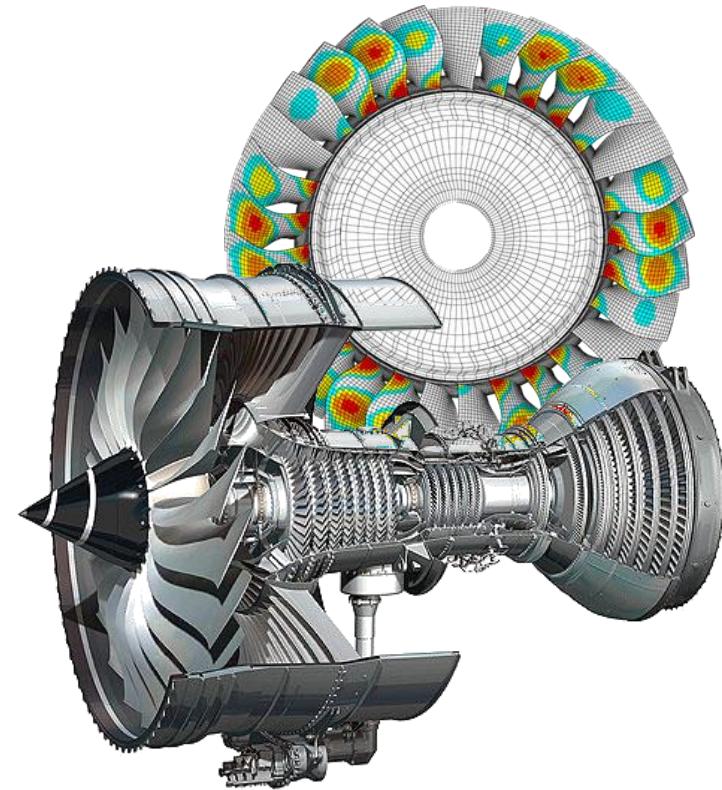
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### #3 Reduced Order Modeling of Multi-Physics System

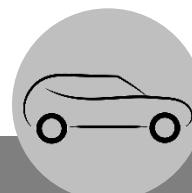
- 복잡한 구조물의 빠른 진동 해석을 위한 방법론 개발
- Multi-physics system의 해석 방법 개발
- 터빈 엔진 Blade의 동역학 해석



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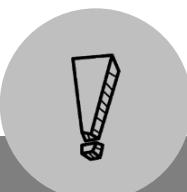


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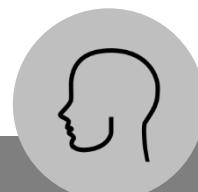


## #4 Parametric nonlinear modeling of dynamic system

- 복잡한 구조물의 동역학 해석
- Multi-physics system의 해석 방법 개발



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