SimCenter.DesignSafe-CI.org

We Are a **Virtual** EF

We are producing **software applications** and **educational activities** to advance research in NHE.

SimCenter NHERI
Center for Computational Modeling and Simulation

Leadership Group

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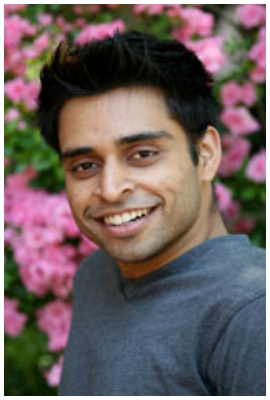
Postdoctoral Team



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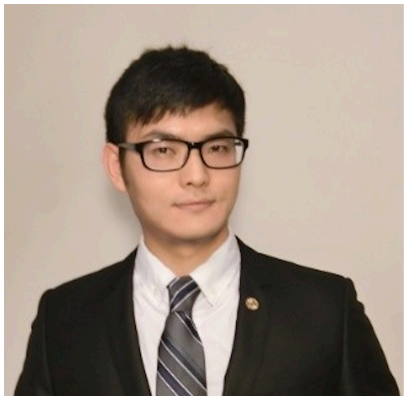

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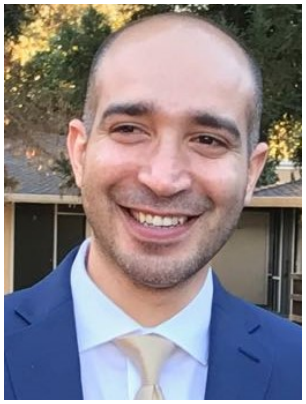

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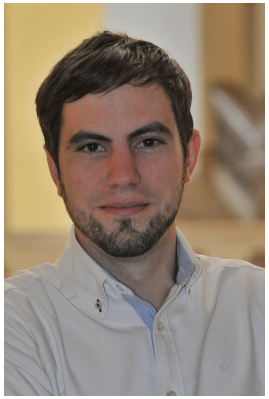

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Faculty Participants

- UW — Pedro Arduino, Mike Motley, Peter Mackenzie-Helnwein
- UCB — Jonathan Bray, Filip Filippou, Paul Waddell
- UCSD — Joel Conte
- USC — Ewa Deelman, Patrick Lynett
- GSU — Ann-Margaret Esnard
- ND — Tracy Kijewski-Correa, Alex Taflanidis
- Stanford — Kincho Law, Eduardo Miranda, Jack Baker
- UCLA — Ertugrul Taciroglu
- CSU Long Beach — Vesna Terzic
- GT — Iris Tien
- Columbia — George Deodatis
- ICSI — Stella Yu

We Are a **Virtual** EF

- We have a starting set of tools: **you can contribute**
- We have a starting set of capabilities: **you can help expand them**
- The system is designed to be flexible and **extensible to meet community needs** as they evolve

SimCenter Goals

- **Develop a computational framework** to support decision-making to enhance community resilience to natural hazards in the face of uncertainty;
- **Seed the framework** with enough data and connectivity to **existing simulation tools** so that it can be employed in the near-term and thus improve as users identify weaknesses and new needs;
- **Create a framework** that is sufficiently **flexible**, **extensible**, and **scalable** so that any component of it can be enhanced to improve the analysis and thereby better meet the needs of a user group; and
- **Provide an ecosystem** that fosters collaboration between scientists, engineers, urban planners, public officials, and others who seek to improve community resilience to natural hazards. Including an **natural hazards engineering education component**.

Software Products We Are Developing

- **W**e are building a number of research applications:
  - **uqFEM:** : To enhance FEM applications with UQ & Optimization
  - **EE-UQ**: To provide response of buildings to earthquake events
  - **CWE-UQ**: To provide response of buildings to wind events
  - **PBE**: EE-UQ + CWE-UQ plus Downtime and Loss estimation
  - **RDT**: *To estimate* Regional Resiliency given Multiple Hazards
  - **OTHER**

SimCenter is developing an **application Framework** that will Enable creation of Scientific Workflow Applications for researchers working in field of NHE

We are Developing **Interfaces, Code to meet the Interfaces** & **Applications.** The applications are being designed to be **flexible** and **extensible.**

Applications are local and cloud-based

```
------------------------------------------------------------------------------
Type           Succeeded Failed  Incomplete  Total     Retries   Total+Retries
Tasks          9297314   0       0           9297314   5417      9302731
Jobs           128539    0       0           128539    1494      130033
Sub-Workflows  38        0       0           38        0         38
------------------------------------------------------------------------------

Workflow wall time                                   : 1 day, 2 hrs
Cumulative job wall time                             : 47 days, 2 hrs
Cumulative job badput wall time                      : 38 secs
```

Research Tools Release Schedule

uqFEM

- **V1.0 (June 2018)**
- V2.0 (2019)
- V3.0 (2020)
- V4.0 (2021)

CWE-UQ

- **V1.0 (June 2018) Bluff Body**
- V2.0 (Jan 2019) Building
- V3.0 (2019) UQ
- AI

EE-UQ

- **V1.0 (August 2018) Uniform**
- V2.0 (Sept 2018) Rock Outcrop
- V3.0 (2019) Soil Box
- AI

PBE

- **V1.0 (Sept 2018) Earthquake**
- V2.0 (2019) Wind
- V3.0 (2020) Water
- AI

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Workflow Testbeds Release Schedule

RDT

- V1.0 (2019) Earthquake
- V2.0 (2020) Wind
- V3.0 (2021) Water

Regional Earthquake

- **V1.0 (June 2018) Rupture to DT&L**
- V2.0 (2019)
- V3.0 (2020)

Water

- V1.0 (Sept 2018)
- V2.0 (2020)
- V3.0 (2021)

Hurricane

- V1.0 (2020)
- V2.0 (2021)

MultiHazard

- V1.0 (2021)

Educational Applications

MDOF

MDOF

- **V1.0 (Oct 2017)**
- **V1.1 (Feb 2018)**

Pile Group

PGT

- **V1.0 (Oct 2017)**
- **V2.0 (May 2018)**

EvW

EvW

- **V1.0 (June 2018)**
- V2.0 (Sept 2019)

BFM

- **V1.0 (Sept 2018)**
- V2.0 (2019)

Educational Applications

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