DESIGNSAFE-CI
A NATURAL HAZARDS ENGINEERING COMMUNITY

Supporting Your Natural Hazards Research

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What is DesignSafe?

- A web-based research platform that enables transformative research to protect human life and reduce damage during natural hazard events

DesignSafe Vision

- A cyberinfrastructure (CI) that is an integral part of research discovery
  - Provide a platform for data sharing/publishing
  - Enable research workflows and access to high performance computing (HPC)
  - Deliver cloud-based tools that support the analysis, visualization, and integration of diverse data types
- Amplify and link the capabilities of natural hazards researchers in the US and abroad

DESIGNSAFE-CI
NHERI: NATURAL HAZARDS ENGINEERING RESEARCH INFRASTRUCTURE

www.designsafe-ci.org

Research Workbench | Learning Center | NHERI Facilities | NHERI Community | About | Help | Search DesignSafe

- Data Depot
- Workspace
- Recon Portal
- SimCenter Research Tools
- User Guides
- Impact of Data Reuse

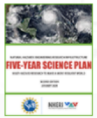
…sed research
…etwork that
…nal tools needed to
…nderstand critical
data for natural hazards research.

Learn how to
Start Using DesignSafe

Browse the Data Depot's
Published Data Sets

Join the conversation in
DesignSafe's Slack Channel

Learn more about
NHERI, the NCO & DesignSafe



NHERI Five-Year
Science Plan
2nd Edition

Visible GOES-16 satellite image of Hurricane Marco (left) and Tropical Storm Laura (right) at 12:50 p.m. EDT Sunday, August 23. (Image credit: NOAA/RAMMB, Yale Climate Connections.)

2020 Hurricane Season: NSF-Funded Natural Hazards Experts Available for Comment

For the 2020 hurricane season, experts from the NSF-supported Natural Hazards Engineering Research Infrastructure (NHERI) are available to discuss a variety of hurricane-related topics. NHERI researchers are authorities in infrastructure damage from wind and storm surge, damage mitigation efforts, societal impacts in hurricane-prone regions and post-event data collection.

FIND MORE NEWS IN THE NEWSROOM

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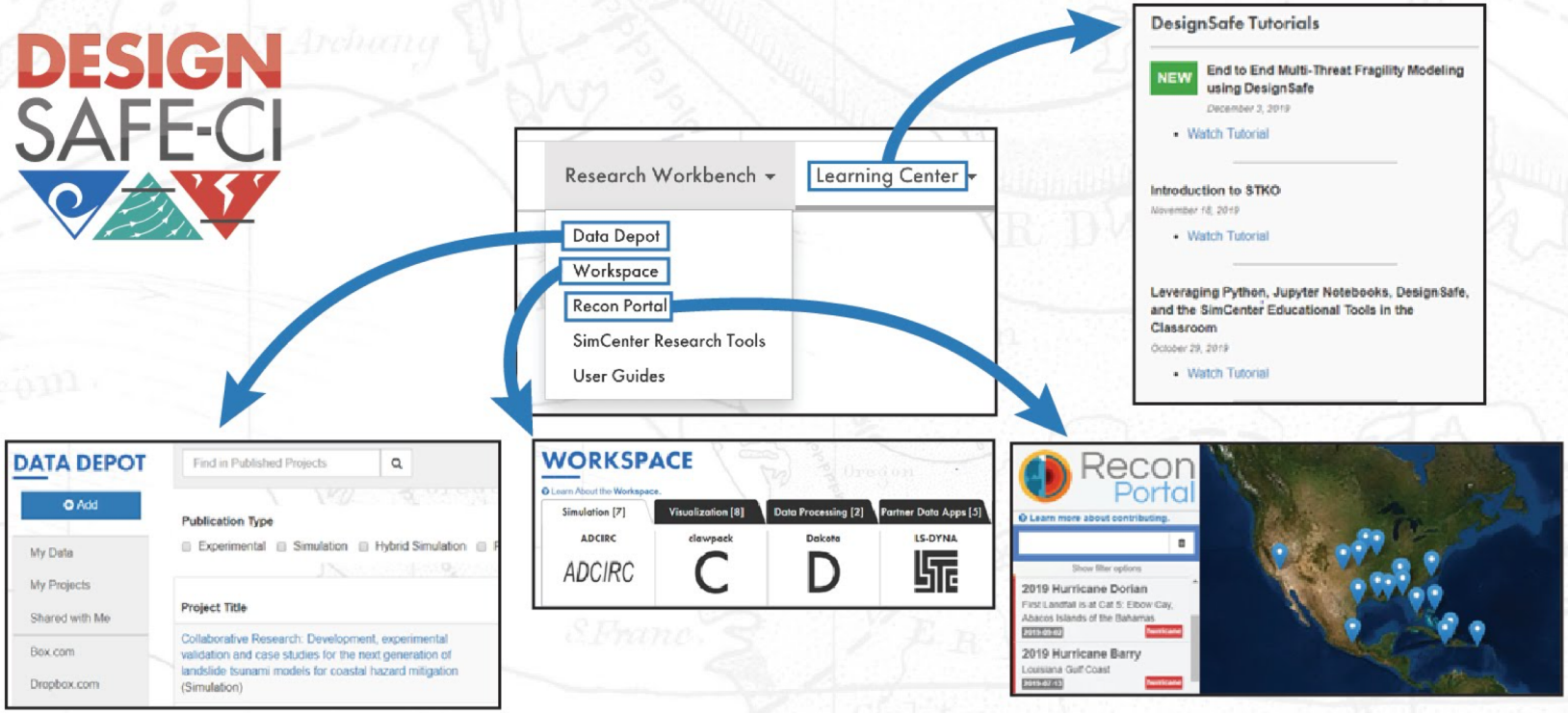
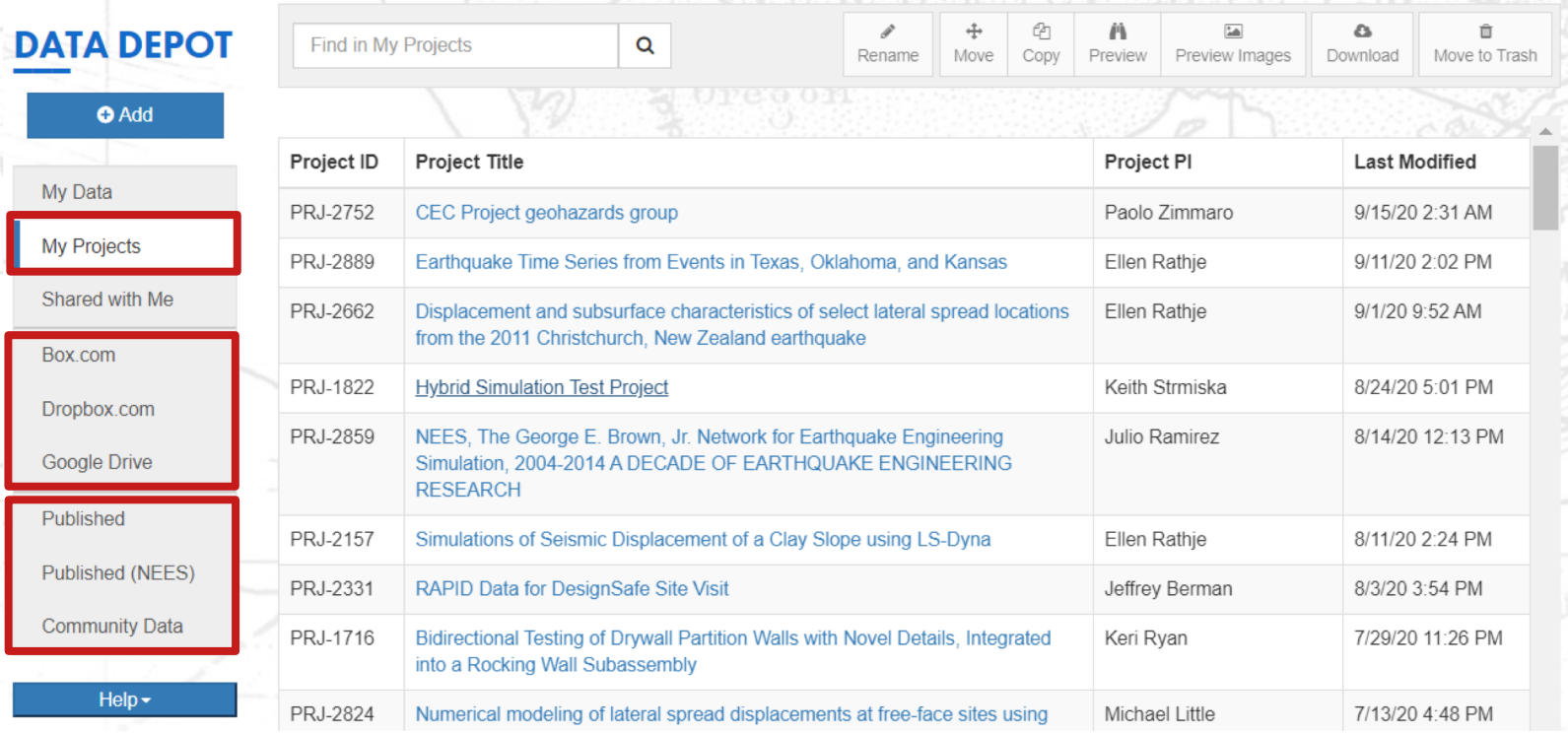


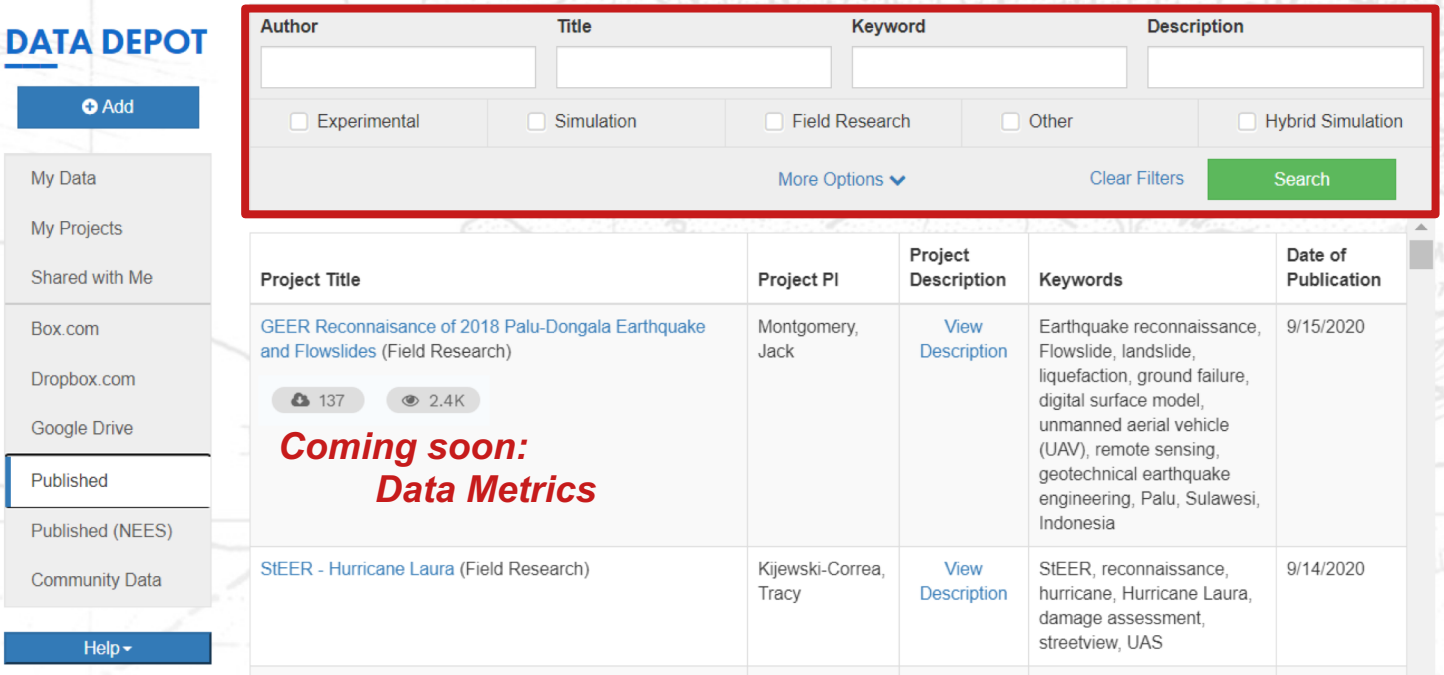
DesignSafe Research Workbench

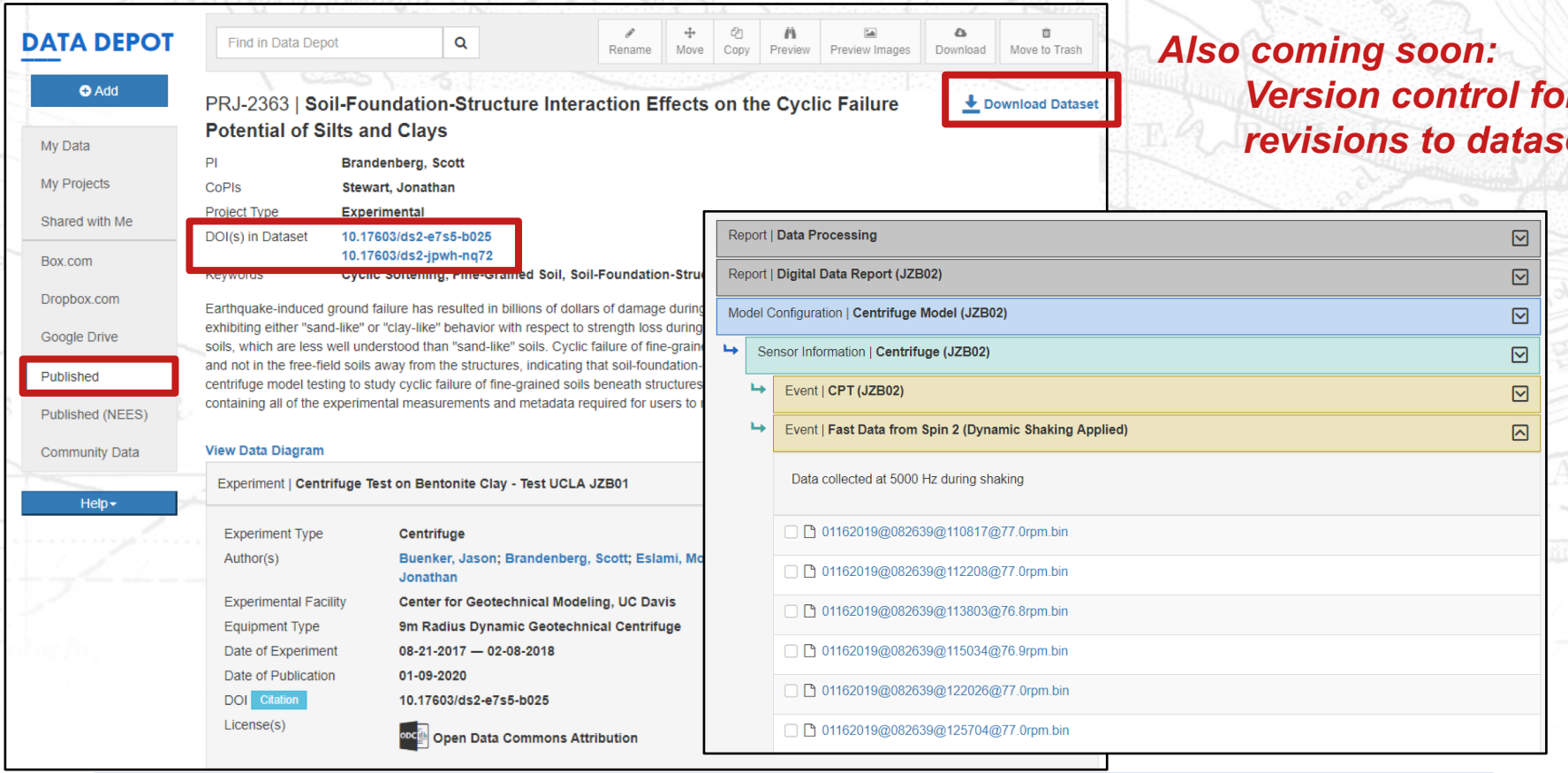
- Data Depot Data Repository
  - Private space (My Data)
  - Collaboration space (My Projects) for data sharing and ultimate publishing
  - Publicly accessible space (Published) for curated data from My Projects
  - Publicly accessible space (Community Data) for uncurated data
- Workspace
  - Apps/tools for computational simulation, data analysis, visualization, etc. with access to files in Data Depot
- Reconnaissance Portal: discover published field data associated with natural hazard events

My Projects: Data here can be eventually published



More detailed search….





Also coming soon: Version control for revisions to datasets

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DesignSafe Data Models

Structured, yet ***flexible***, data models for different types of research

- **Experimental Project**
  For physical work, typically done at an experimental facility or in the field.
- **Simulation Project**
  For numerical and/or analytical work, done with software.
- **Hybrid Simulation Project**
  For work using both physical and numerical components.
- **Field Research Project**
  For work done by observation in areas affected by a natural hazard.
- **Other Project**
  For work other than the project types above.

Data Curation

- Curation and publication guidelines under User Guides
  - https://www.designsafe-ci.org/rw/user-guides/data-curation-publication/
- Data transfer methods
  - https://www.designsafe-ci.org/rw/user-guides/data-transfer-guide/
  - Web browser/Dropbox/etc (smaller uploads), Globus, Cyberduck
- Virtual Curation Office Hours
  - DesignSafe Data Curators: Maria Esteva and Mahyar Sharifi
  - Tuesday and Thursday at 1 pm Central (or by appt)
  - https://www.designsafe-ci.org/learning-center/training/

Make **your** data count!

Make your research re-producible and your data re-usable

- ***Formally publish*** data sets in stable data repositories
  - Include data processing scripts, visualizations, etc.
- Data needs a permanent, ***digital location (DOI)*** not just a URL
  - List curated data sets on your CV, just like papers
- Cite data publication ***in your reference list*** of your paper using DOI, citation language as indicated in DesignSafe

provided here. Additionally, the probabilistic approaches described in this paper are implemented as executable Jupyter notebooks (Saygili 2018a, b). These notebooks can be accessed in the Data

References

Saygili, G., Rathje, E., and Wang, Y. (2018a). "Probabilistic seismic hazard analysis for the sliding displacement of rigid sliding masses [Data set]." Designsafe-CI ⟨https://doi.org/10.17603/ds22d6k⟩

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Make **your** data count!

MAKE DATA COUNT

PRJ-2769 | **Food Access Impact Survey for Southeast and Harris County, Texas after Hurricane Harvey in 2017**

Download Dataset

PI	**Rosenheim, Nathanael**
Project Type	**Field Research**
Event	**Hurricane Harvey | Southeast Texas | 08-25-2017 — 08-31-2017 |** Lat 30.049840 Long -94.077210
Event Type	**Flood, Hurricane**
DOI(s) in Dataset	10.17603/ds2-aq2k-dy92
Related Work	
Keywords	**Field Research Planning, Food Access, Survey Instruments, Sample Frame**

View Data Diagram

Documents | **Food Retail Survey Instrument**

Author(s)	**Rosenheim, Nathanael; Peacock, Walter; Perez, Maria; Lane, Gina**
Date of Publication	**06-18-2020**
DOI Citation	**10.17603/ds2-aq2k-dy92**
License(s)	**Creative Commons Attribution Share Alike**

This collection archives instruments related to the food retail survey conducted by the Hazard Reduction Recovery Center, as part of a National Science Foundation-funded project. The instrument was designed to gather specific types of information on food retailers affected by Hurricane Harvey. The survey instrument was designed to collect information on: (1) Physical and infrastructure damage, (2) Accessibility problems, (3) Impact on employees and customers, (4) Business interruption, (5) Impact on fresh food availability, and (6) Business characteristics. The survey was designed to be answered by an employee with knowledge about store operations and food availability before and after Hurricane Harvey. The survey was designed to be conducted in-person. This archive documents two versions of the survey. The first version was for use in Jefferson and Orange County, Texas. The second version was for use in Harris County, Texas.

Citation

Rosenheim, N. Peacock, W. Perez, M. Lane, G. (2020) "Food Retail Survey Instrument", in *Food Access Impact Survey for Southeast and Harris County, Texas after Hurricane Harvey in 2017*. DesignSafe-CI. https://doi.org/10.17603/ds2-aq2k-dy92.

Download Citation

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PRJ-1811: NHERI UCSD Hybrid Simulation Commissioning

Download Dataset

PI	Mosqueda, Gilberto	View Team Members	**DOI**	doi:10.17603/DS25M42	Citation
Date of Publication	Dec/6/2018		**Award**	NSF 1520904	
Project Type	Hybrid_simulation		**Keywords**	hybrid simulation, shake table substructure, seismic isolation	

Description

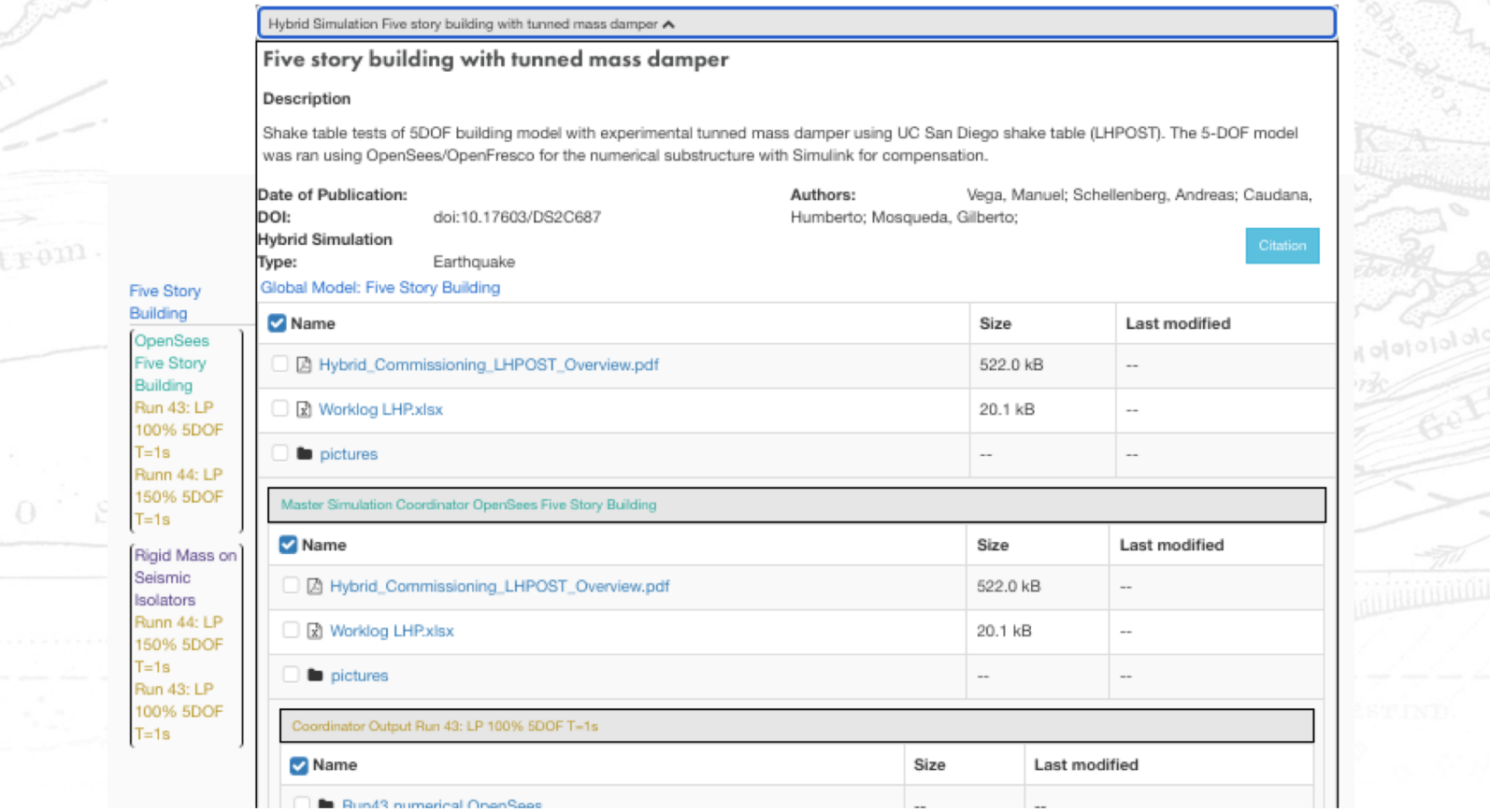
The use of large shake tables can provide extended capabilities to conduct large- and full-scale tests examining the seismic behavior of structural systems that cannot be readily obtained from reduced scale testing, or under pseudo-dynamic conditions. When considering large or complex structural systems, however, additional challenges arise such as high costs of full scale specimens or capacity limitations of currently available shake table. Some of these limitations can be overcome by real-time hybrid shake-table substructure test method that requires only key parts to be evaluated experimentally on the shake table while the remainder of the structure is modeled numerically. As a demonstration of the applicability of this method using a large shake tables, a series of hybrid shake table tests were conducted on the UCSD Large High Performance Outdoor Shake Table (LHPOST) with capabilities to test full scale structural models. A physical specimen was built on the LHPOST, and coupled with a numerical model using hybrid simulation techniques. Comparison of different methods to interface the numerical model with the control systems were evaluated. The physical specimen consisted on a rigid mass resting on four triple friction pendulum bearings that represented the upper story of a shear building model having the effect of a tune mass damper. Numerical models of shear buildings with different periods and multiple degree of freedom were considered to evaluate the performance of the table and stability and accuracy of the simulation results. The teste results demonstrate the effectiveness of tune mass dampers in reducing structural response and the benefit of using a hybrid shake table test method towards expanded system level dynamic testing. The performance of the shake table is evaluated and methods to compensate delay and other sources of error are discussed.

PRJ-1811

Hybrid Simulation Five story building with tunned mass damper

Hybrid Simulation One story building with tuned mass damper - OpenSees

Hybrid Simulation One story building with tuned mass damper - SimulinkRT


Hybrid Simulation Five story building with tunned mass damper
Five story building with tunned mass damper
Description
Shake table tests of 5DOF building model with experimental tunned mass damper using UC San Diego shake table (LHPOST). The 5-DOF model was ran using OpenSees/OpenFresco for the numerical substructure with Simulink for compensation.
Date of Publication:
DOI: doi:10.17603/DS2C687
Hybrid Simulation Type: Earthquake
Authors: Vega, Manuel; Schellenberg, Andreas; Caudana, Humberto; Mosqueda, Gilberto;
Citation
Global Model: Five Story Building
Five Story Building
OpenSees Five Story Building
Run 43: LP 100% 5DOF T=1s
Runn 44: LP 150% 5DOF T=1s
Rigid Mass on Seismic Isolators
Runn 44: LP 150% 5DOF T=1s
Run 43: LP 100% 5DOF T=1s
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Worklog LHP.xlsx
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Master Simulation Coordinator OpenSees Five Story Building
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Reconnaissance Portal

Identifying Archived Datasets from Recon Events

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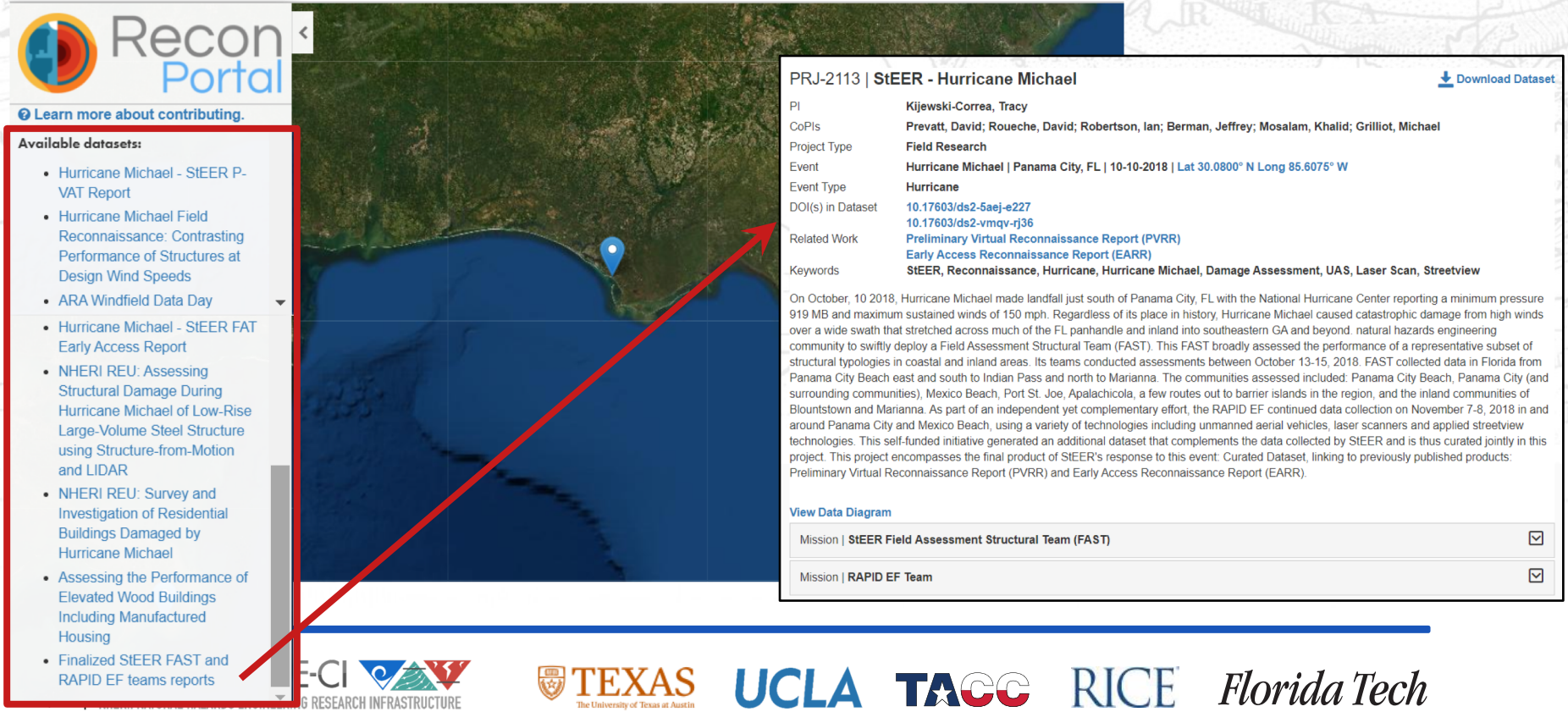
Recon Portal → Data Depot



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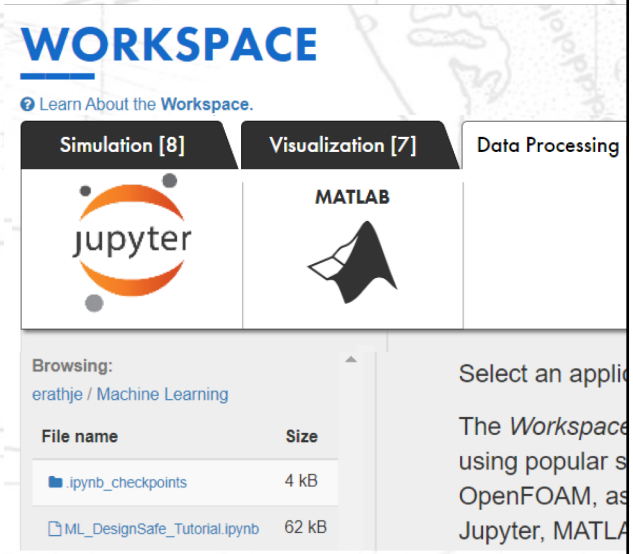
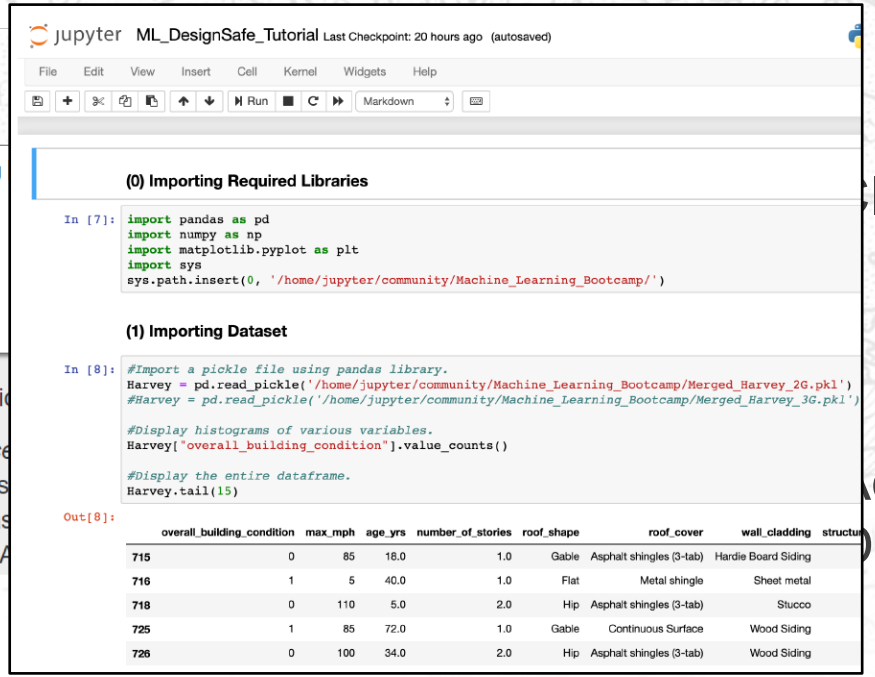
Discovery Workspace





	overall_building_condition	max_mph	age_yrs	number_of_stories	roof_shape	roof_cover	wall_cladding	structur
715	0	85	18.0	1.0	Gable	Asphalt shingles (3-tab)	Hardie Board Siding	
716	1	5	40.0	1.0	Flat	Metal shingle	Sheet metal	
718	0	110	5.0	2.0	Hip	Asphalt shingles (3-tab)	Stucco	
725	1	85	72.0	1.0	Gable	Continuous Surface	Wood Siding	
726	0	100	34.0	2.0	Hip	Asphalt shingles (3-tab)	Wood Siding	

- Cloud-based tools
  - HPC or VM
  - Batch
  - Interactive
- Access to Data
  - Depot files

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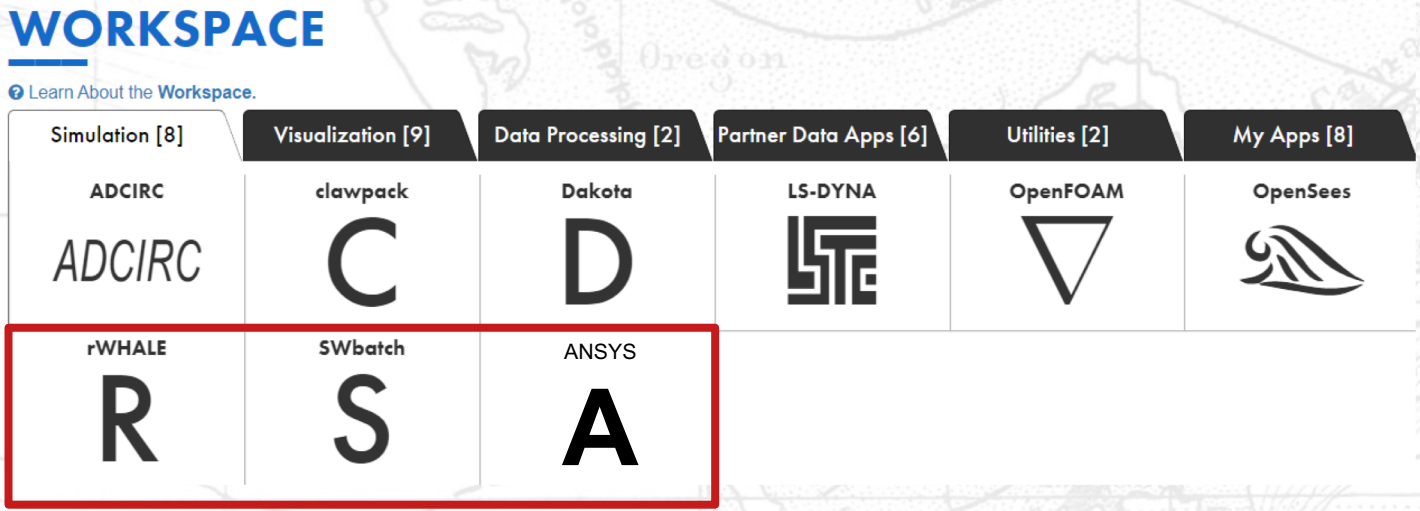
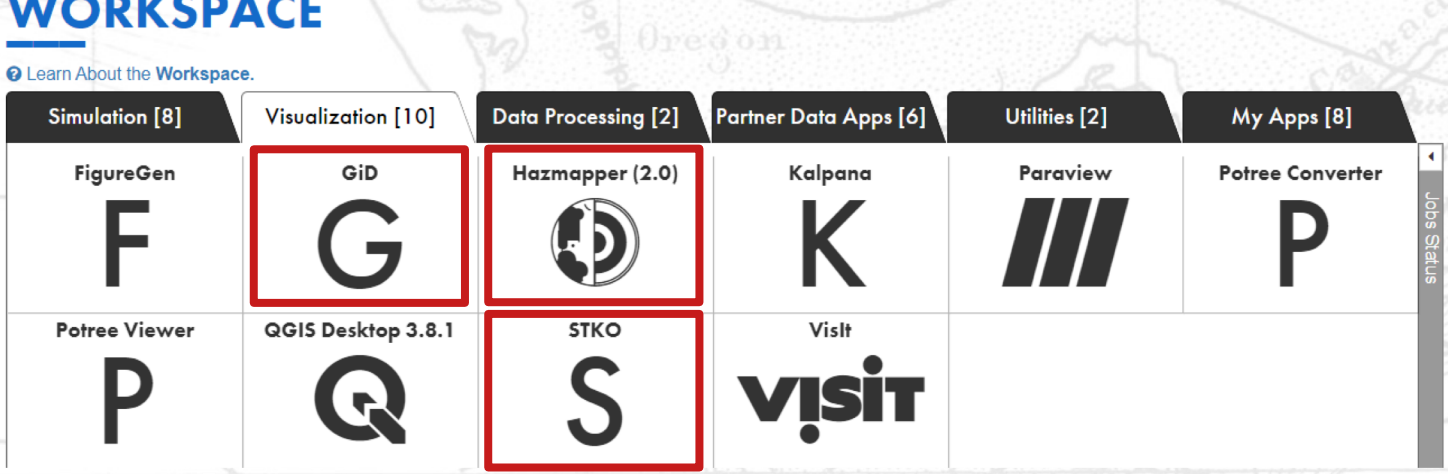
Discovery Workspace - Simulation



- HPC-enabled simulation codes (Stampede2, Frontera)
- Available through portal or at the Command Line, easy access to HPC allocation (CPUs, GPUs) through DesignSafe

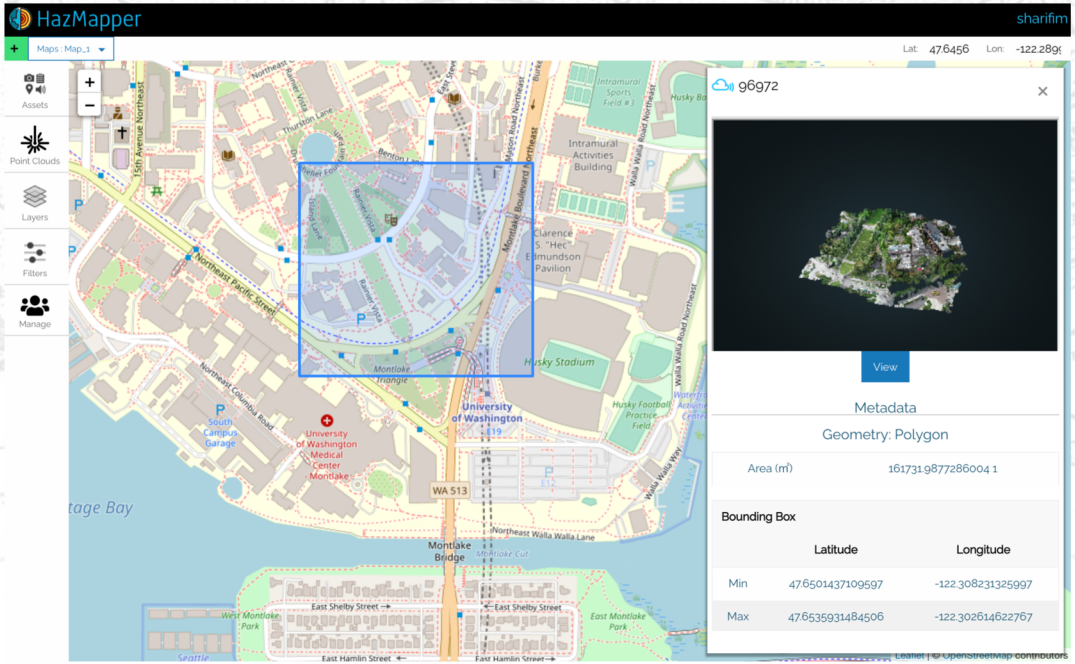
Discovery Workspace - Visualization



- STKO and GiD for pre/post processing of OpenSees simulations
- Enhancements to HazMapper, a web-app for geospatial data

Workspace – HazMapper

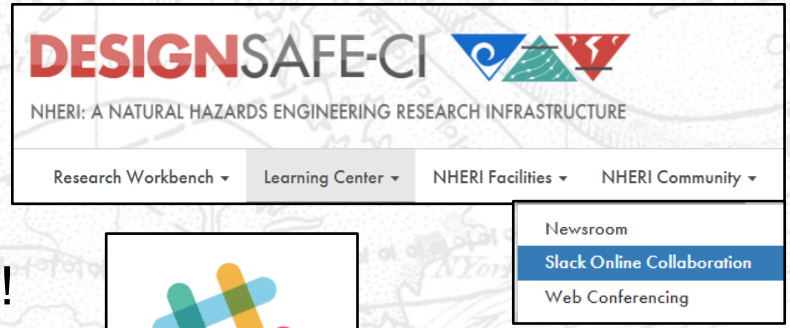
- Interactive map viewer for geospatial data
  - Images
  - GPX tracks
  - Point clouds
  - Videos
  - GeoJSON
- April 2020 Webinar
- June 2020 updated documentation



DesignSafe: We are here for you!

Available to the Global Natural Hazards Research Community

- Interact with us and the community using the DesignSafe Slack team
- Cite data using DOIs in your reference list!
- Cite DesignSafe marker paper (Rathje et al. 2017, *Natural Hazards Review*) if you use DesignSafe in your research



Please share your feedback, ideas, experiences!

Ellen Rathje e.rathje@mail.utexas.edu