Center for Extreme Events Research

UC San Diego
JACOBS SCHOOL OF ENGINEERING

Prepare. Protect. Respond.

We help prepare for extreme events. We protect entire built infrastructures, as well as humans, from extreme events such as blasts from terrorist attacks and mining explosions, car crashes, sports collisions, and natural disasters including earthquakes and landslides. After an extreme event, we provide rapid damage and vulnerability assessments.

At the Center for Extreme Events Research, we have world-renowned expertise in both experimental and computational investigation methods. We leverage this expertise to develop the assessment tools and experiments our research partners need to prepare, protect and respond.

Join us.

Our Competitive Advantages

WORLD'S BEST TESTING FACILITIES

Blast / extreme-events simulator | Gas gun and impact testing facilities | Large-scale soil box seismic testing

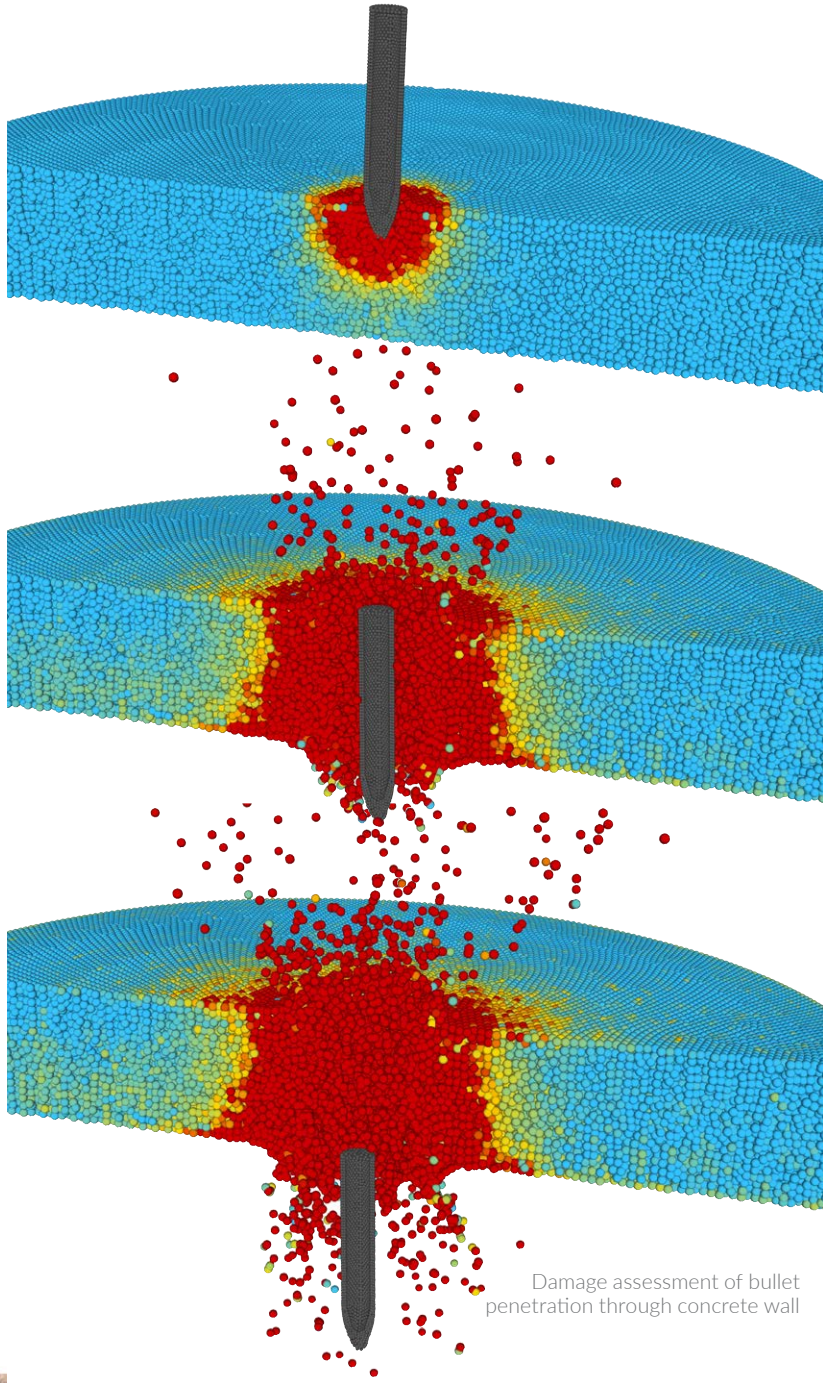
UNRIVALED COMPUTATIONAL EXPERTISE

Advanced finite elements | meshfree methods | Isogeometric analysis

Our software systems empower research partners to solve otherwise intractable simulation challenges.

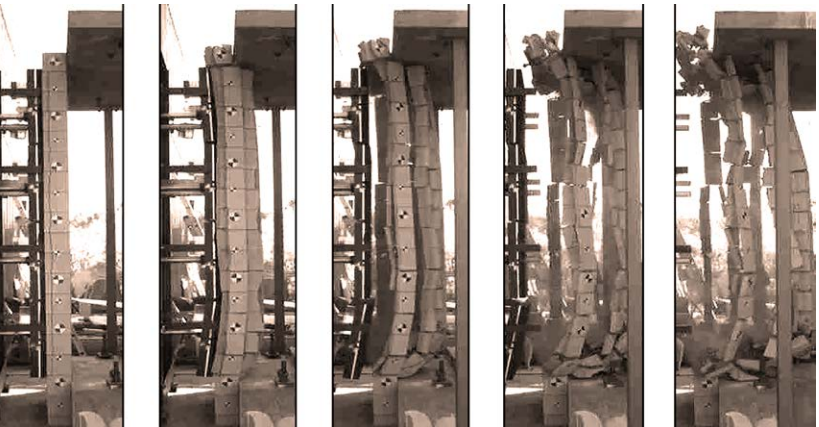
WE COMBINE EXPERIMENTAL AND COMPUTATIONAL TECHNOLOGIES

We validate large-scale computational simulations using our unparalleled testing facilities. Validated computational capabilities can be fully integrated to provide fast damage assessment of structures in recovery efforts.



Damage assessment of bullet penetration through concrete wall

Image sequence: masonry wall subjected to blast load



Membership Opportunities

Access to multidisciplinary innovation through workshops, short courses, visiting-scholar opportunities for research staff, and one-on-one collaborations.

Student recruiting: access to the most promising students. **Connect with emerging technical talent.**

Gain insight into the future of the field.

WHO WE ARE and WHAT WE DO

Buildings. Bridges. Power plants. Cars. Human bodies. When it comes to extreme events, both natural and human caused, we prepare, protect and assess these structures, and many more.

STRUCTURAL ENGINEERING

Robert Asaro
Composite design and manufacturing technologies for large scale structures and marine applications. Deformation, fracture and fatigue of high temperature intermetallics.

Yuri Bazilevs
Design of robust and efficient computational methods for large scale, high performance computing

Jiun-Shyan (J.S.) Chen
Meshfree based computational techniques for damage assessment of solids and structures subjected to extreme loadings such as shocks, penetrations, blasts, landslides, as well as multiscale modeling of biomaterials.

Veronica Eliasson
Fluid mechanics and gas dynamics theory combined with solid mechanics and fracture dynamics. Better understanding of failure modes of solids during highly dynamic, short duration tests to assess the response of structures. Applications: minimizing or avoiding earthquake impact on dams, underwater explosions on naval structures, and non-invasive kidney stone treatment.

Gilbert Hegemier
Hazard mitigation engineering using advanced materials and design to retrofit critical infrastructure systems and components.

Tara Hutchinson
Earthquake and geotechnical engineering, performance assessment of structural/nonstructural components, and machine learning and computer vision methods for damage estimation.

H. Alicia Kim
Topology optimization for structures and materials, level set method, design of tow-steered fiber composites, multiscale and multifunctional designs.

Hyonny Kim
Impact effects on composite materials and structures with aerospace and other applications, multifunctional materials, nano-materials, and adhesive bonding.

Falko Kuester
Scientific visualization, including distributed and remote visualization of large data sets.

Kenneth J. Loh
Multifunctional materials for structural health monitoring, enhanced structural performance, and resilient systems.

MECHANICAL AND AEROSPACE ENGINEERING

Vitali Nesterenko
New experimental capabilities for dynamic testing. Physics and mechanics of shock and high strain, strain rate deformation, instability and fragmentation of heterogeneous solid materials.

Albert P. Pisano
MEMS, manufacturing, wireless sensors for harsh environments, low-cost sensors.

Sutanu Sarkar
Computational fluid dynamics, turbulence, environmental flows.

RADIOLOGY

Shantanu Sinha
Medical physics, biomedical imaging and modeling of the musculoskeletal system under normal and diseased conditions.

MATHEMATICS

Randolph Bank
Scientific computing, numerical partial differential equations.

Li-Tien Cheng
Scientific computing, image processing, level set methods, numerical partial differential equations.

Michael Holst
Scientific computing, numerical analysis, applied analysis, mathematical physics, partial differential equations.

SAN DIEGO SUPERCOMPUTER CENTER (SDSC)

Amitava Majumdar
Director of SDSC's Data Enabled Scientific Computing division which includes High Performance Computing Systems, User Services, and Scientific Computing. Scientific applications on HPC machines.

Mahidhar Tatineni
Parallelization, scaling analysis and performance optimization of HPC applications on multi-petaflop supercomputers. Data-intensive high performance computing.

Short Courses

We develop short courses to provide our partners with focused, cutting-edge professional training in the topics that matter most, including:

- Experimental and Computational Investigation of Extreme Events
- Meshfree Methods
- Isogeometric Analysis

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