

ADDRESS:

Purdue University
Department of Earth and Atmospheric Science
550 Stadium Mall Drive
West Lafayette, IN 47907
Email: shaq@purdue.edu
Phone (765) 496-7206

PROFESSIONAL PREPARATION:

Ph.D. Geophysics, December 2004
Thesis Title: Mechanics of Strain Partitioning at Convergent Margins
Stony Brook University, Stony Brook, New York.
M.S., Geophysics, May 1997.
Stony Brook University, Stony Brook, NY
Thesis Title: The Effect of Terrane Migration Along Oblique Margins: Examples
in The Sulaiman Fold-And-Thrust Belt, Pakistan.
B.S., Geology, May 1994.
State University of New York at Stony Brook, Stony Brook, NY

APPOINTMENTS:

Assistant Professor of Practice: Purdue University, August 2014 – present.
Assistant Professor: Purdue University, August 2008 – August 2014.
Visiting Assistant Professor: Purdue University, August 2005 – July 2008.
Postdoctoral Fellow: Carnegie Institution of Washington, Department of Terrestrial
Magnetism, January 2005 – July 2005.
Postdoctoral Associate: State University of New York at Stony Brook, August 2004 –
December 2004.
Research Assistant: State University of New York at Stony Brook, May 1995 – May
1997 and June 1999 – August 2004.
Teaching Assistant: State University of New York at Stony Brook, August 1994 – May
1995 and August 1998 – May 1999.

STATEMENT OF RESEARCH

I investigate how the mechanical properties of mountain belts affect their fundamental attributes, including size, shape, and the rate, style and distribution of strain, using numerical and scale analog modeling. My work focuses on understanding the roles of such factors as bulk rheology of the crust, the influence of basement structures, and the role that margin geometry has on the localization of deformation. Much of my current research focuses on understanding how and when extension will be localized, in normal and oblique contractional settings, as patterns of faulting, and separately the evolution of out-of-sequence faulting in response to factors such as erosion and mechanical strength variations at depth (i.e., along the décollement) in fold-belts. Analog modeling is conducted using a variety of apparatuses in conjunction with automated, quantitative analysis employing sophisticated remote sensing tools and techniques. The

innovative analysis techniques that I have developed and use in my lab allow me to calculate the deformation occurring in analog models due to variations in obliquity, rheology, and boundary conditions in relation to the development of topography and the structures that accommodate deformation. When these techniques are integrated with our new 3D numerical modeling methods it gives me a powerful set of tools to address problems in active tectonics.

FUNDED PROPOSALS

NSF # 1145223, Evaluating the Role of Glaciation on the Structural Configuration of the Southern Alaska Syntaxis, \$ 318,968, PI: S. Haq

PRF Summer Faculty Grant, \$8000; S. Haq

NSF #0738920, Extensional Deformation in Convergent Systems, \$211,874, PI: S. Haq

TEACHING EXPERIENCE

EAPS (SCI) 360 Great Issues in Science and Society Fall, 2013,2014, 2015

EAPS 352 (391) (*Structural Geology - majors*), Fall 2009, Fall 2010, Spring 2013, 2014, 2015

EAPS 104 (*Oceanography – non-majors*) - Spring 2015

EAPS 111 (*Physical Geology – non-majors*) - Fall 2005, 2006, 2007, 2012, 2013; 2014, 2015 Spring 2006, 2008, 2010, 2011, 2012, 2014

EAPS 191R (*Introduction to Physical Geology - majors*), Spring 2007

EAPS 591 (*Graduate Seminar – Oblique Convergent Tectonics*), Spring 2007

EAPS 591 (*Graduate Seminar - GAT Seminar*), Spring 2009

EAPS 497 (*Undergraduate Independent Research*), Tim Shackelford, Spring 2007;

Nick Farny, Spring 2008 and Spring 2009, Fall 2009, Spring 2010; *Russell Martin*, Fall 2008 and Spring 2009, Fall 2009, Spring 2010. *Zach Umperovitch* Fall 2009, Spring 2010; Megan Neary, 2014; Rejith Raghavan, 2014 -2015

EAPS 591 (*Topics in Structural Geology*), Spring 2012

TEACHING STATEMENT

While at Purdue I have regularly taught Physical Geology (EAPS 111), a large service course. During this period the class has undergone a comprehensive reorganization that has involved considerable effort and time on my part coordinating lectures and labs. This effort has also focused on making the labs inquiry driven allowing the students to directly apply material they have learned in lecture. While teaching this course I have gained considerable experience, I have improved my lecturing technique and my course management skills each semester. During this time I have also gained an appreciation for an inquiry based teaching style, which I believe is essential for undergraduate learning, especially in large enrollment courses. I have applied these lessons in the other courses I have taught. I believe that involving undergraduates in research, when possible, is an important part of their learning and regularly mentor students in my lab.

INVITED TALKS

Institute of Geophysics, China Earthquake Administration, Beijing, China

Haq, S.S.B., Out-of-Sequence Thrusting in Experimental Coulomb Wedges: *Implications for the Structural Development of Mega-splay Faults and Forearc Basins*
September, 2015

GFZ Potsdam, Germany, Workshop on Advances in Quantitative Analogue Modeling

Haq, S. S. B., September 2013, Diagnosing Strain in Analog Models September 2013.

Structural Geology and Tectonics Forum, Williams College, MA.

Haq, S. S. B., May 2012, The Mechanical Response of Glacially Eroded Wedges:
Possible Implications for Southern Alaska.

Department of Earth and Space Sciences, UCLA, Institute of Geophysics and Planetary Physics Invited Speaker

Haq, S. S. B., May 2011, Partitioning of Deformation During Oblique Convergence:
Insights From Kinematic Analysis of Analog Models.

Department of Geology, University of Illinois-Urbain-Champaign, September 2010.

Indiana University – Purdue University Department of Earth Sciences

Haq, S. S. B., 2010; Partitioning of Deformation in Critical Coulomb Wedges, April 2010.

Rice University Department of Earth Science Colloquium

Haq, S. S. B., 2007; The Influence of Rheology on Deformation Partitioning and the
Localization of Shear at Convergent Margins, February 2007.

PUBLICATIONS

Haq, S. S. B., Out-of-sequence thrusting in experimental Coulomb wedges: Implications for the structural development of mega-splay faults and forearc basins, *GRL*, V39, L20306, doi:10.1029/2012GL053176, 2012

Haq, S. S. B., and Davis, D. M., 2010, Mechanics of fore-arc slivers: Insights from simple analog models, *Tectonics*, 29, TC5015, doi:10.1029/2009TC002583.

Haq, S. S. B., and Davis, D.M., 2009, Interpreting finite strain: Analysis of deformation in analog models, *Journal of Structural Geology*, V31, Issue 7, p. 654-661

Haq, S. S. B., and Davis, D. M., 2008, Extension During Active Collision in Thin-skinned Wedges: Insights from Laboratory Experiments, *Geology*, v. 36, p. 475-478.

Haq, S. S. B., and Davis, D. M., 1997, Oblique Convergence and the Lobate Mountain Belts of Western Pakistan, *Geology*, v. 25, No. 1, p. 23-26.



PUBLICATIONS SUBMITTED AND PREPARATION

Haq, S. S. B and Davis, D. M – Critical Taper in Oblique Frictional Wedges, to be submitted *Tectonics* May, 2016

Koster, K., **Haq, S. S. B.**, and Flesch, L. M. – Extensional Deformation in Actively Contracting Orogens, in prep, to be submitted to *tectonics*, Resubmit May 2016

Haq, S. S. B.; Marshak, S., Sen, P.*; The Nucleation and Propagation of Thrust Ramps: Insights from Quantitative Analysis of Frictional Analog, in Prep

ABSTRACTS

- 1.) Newman, P.*, Davis, K., **Haq, S.S.B.**, and Ridgway, K., The Influence of Localized Glacial Erosion on Exhumation Paths in Accreting Coulomb Wedges: Insights from Particle Velocimetry Analysis of Sandbox, American Geophysical Union, Fall Meeting 2015, abstract T33A-2924
- 2.) **Haq, S.S.B.**, Using particle velocimetry to quantify the activity on out-of-sequence thrusting In coulomb wedges, Analog Modeling of Tectonic Processes Workshop, May 13-15 Amherst, Massachusetts
- 3.) **Haq, S.S.B.**, Marshak, S., and Sen, P., Initiation of ramp faults in fold-thrust belts: Insight from quantitative image analysis of sandbox models, Analog Modeling of Tectonic Processes Workshop, May 13-15 Amherst, Massachusetts
- 4.) Newman, P.*, Davis, K. and **Haq, S.S.B.**, Comparing Uplift Versus Erosion in Critical Wedges using Particle Tracking Velocimetry, Analog Modeling of Tectonic Processes Workshop, May 13-15 Amherst, Massachusetts
- 5.) Davis, D M., **Haq, S.S.B.**, and Kraner, M., Tracking thrust histories in thin-skinned analog models, Analog Modeling of Tectonic Processes Workshop, May 13-15 Amherst, Massachusetts
- 6.) *Davis, K., *, **Haq, S. S. B.***, and Ridgway, K., 2014, Evaluating The Links Between Mountain Building, Climate And Flat Slab Subduction Along The Southern Alaska Convergent Margin: An Experimental Approach, Geological Society of America Abstracts with Programs, Vol. 46, No. 6, p. 364.
- 7.) **Haq, S. S. B.** Out of Sequence Thrusting in Coulomb Wedges, Structural Geology and Tectonics Forum, 2014, Colorado School Of Mines, Golden, CO.
- 8.) Sen, P.*; **Haq, S. S.**; Marshak, S., The Nucleation and Propagation of Thrust Ramps: Insights from Quantitative Analysis of Frictional Sandbox Models, 2014, Colorado School Of Mines, Golden, CO.
- 9.) *Davis, D. M.*; **Haq, S. S.**, and Grady, C., Tracking Fault History in Sandbox Models, 2014, Colorado School Of Mines, Golden, CO.
- 10.) **Haq, S. S.**, Out-Of-Sequence Thrusting In Coulomb Wedges: Implications For The Structural Development Of Mega-Splay Faults And Forearc Basins, American Geophysical Union, Fall Meeting 2012, abstract #T13B-2592. 
- 11.) Sen, P.*; **Haq, S. S.**; Marshak, S., The Nucleation and Propagation of Thrust Ramps: Insights from Quantitative Analysis of Frictional Analog (Sandbox) Models, American Geophysical Union, Fall Meeting 2012, abstract # T23D-2711
- 12.) *Davis, D. M.*; **Haq, S. S.**, Evolution of Strain in Obliquely Convergent Analog Doubly-Vergent Wedges,  American Geophysical Union, Fall Meeting 2012, abstract #T31G-01.
- 13.) *Yin, A.*; Reith, R. C.; **Haq, S. S.**, (*Invited*), A new analogue-experimental apparatus incorporating thermal weakening and basal shear for investigating lithospheric deformation of the Indo-Asian collision, American Geophysical Union, Fall Meeting 2012, abstract # T31G-04.

- 14.) *Koster, K. L. **; **Haq, S. S.**; *Flesch, L. M.*, A Numerical Study of Strain Partitioning and the Development of Forearc Slivers at Obliquely Convergent Margins, American Geophysical Union, Fall Meeting 2012, abstract # T33F-2713
- 15) **Haq, S. S.**; (*Invited*), The Mechanical Response of Glacially Eroded Wedges: *Possible Implications for Southern Alaska*, Structural Geology and Tectonics Forum, 2012, Williams College, MA.
- 16.) **Haq, S.S.**, and *Umperovitch, Z.*, 2011, Modeling the Mechanical Response of Glacially Eroded Wedges: Implications for Southern Alaska, American Geophysical Union, Fall Meeting 2011, abstract # T33A-2369.
- 17.) *Martin, R.S. ** and **Haq, S. S.**, 2011, The Role of Margin Geometry and Rheology in the Structural Development of Curved Convergent Margins: Implications for the Bolivian Orocline, American Geophysical Union, Fall Meeting 2011, abstract #T13C-2394.
- 18.) *Koster, K.**, **Haq, S. S.**, *Flesch, L. M.*, 2011, Comparing Numerical and Analog Models of Oblique Convergence With Nature, American Geophysical Union, Fall Meeting 2011, abstract #T13C-2395.
- 19.) *Umperovitch, Z.** and **Haq, S. S.**, Glacial Erosion in Brittle Wedges: Insights Using Quantified Analog Models, American Geophysical Union, Fall Meeting 2010, abstract #T53A-2112, 2010
- 20.) **Haq, S. S.**; *Koster, K.*; *Martin, R. S.*; *Flesch, L. M.*, Analysis of Oblique Wedges Using Analog and Numerical Models, American Geophysical Union, Fall Meeting 2010, abstract #T53A-2111, 2010.
- 21.) **Haq S. S. B.**, Investigating the Role of Rheology in Localizing Margin Parallel Shear in Oblique Wedges: Insights Using Deformation Analysis in Analog Models. Structural Geology and Tectonics Forum Madison, WI., May 2010
- 22.) **Haq, S. S. B.**, and *Flesch, L. M.*, 2009, The Influence of Margin Geometry on Extensional Deformation in Orogens, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract #T33A-1869.
- 23.) **Haq, S. S. B.**, 2009, Analysis of Strain Partitioning in Analog Oblique Convergent Wedges, *Geological Society of America Abstracts with Programs*, Vol. 41, No. 7, p. 291.
- 24.) **Haq, S. S. B.**, and *Flesch, L. M.*, 2008, Investigating the Role of Extensional Deformation at Convergent Margins Using a Combined Analog and Numerical Approach, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract T23B-2012.
- 25.) *Flesch L. M.**, *Dimitrova, L.L.*, *Haines, A. J.*, *Holt, W. E.*, *Haines, M.*, **Haq, S. S. B.**, 2008, Dynamical Modeling for Generally Shaped, Layered Lithospheric Geometries Using Continuous Field Variables, *Eos Trans.*, Fall Meet. Abstract DI31A-1785.
- 26.) **Haq, S. S. B.**, and *Davis, D. M.*, 2008, Extension During Active Collision in Thin-skinned Wedges: Insights from Laboratory Experiments, *Geological Society of America Abstracts with Programs*, Vol. 40, No. 1, p. 76.
- 27.) **Haq, S. S. B.**, and *Davis, D. M.*, 2007, Rigid Basement and the Evolution of the Pakistani Convergent Margin, *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract T23D-1644.

- 28.) **Haq, S. S. B.**, and Davis, D. M., 2006; High Resolution Analysis of Evolving Horizontal Deformation Fields in Model Wedges: EOS (Transactions, American Geophysical Union), Fall AGU 2006.
- 29.) Davis, D. M., and **Haq, S. S. B.**, 2006; Analog Models of Contractional Wedges: Opportunities and Limitations in Testing Theory: EOS (Transactions, American Geophysical Union), Fall AGU 2006.
- 30.) **Haq, S. S. B.**, 2006; Rheologic Dependence of Strain Partitioning During Oblique Convergence: MyRes Meeting Verbani Italy, July 2006.
- 31.) **Haq, S. S. B.**, and Davis, D. M., 2005 Modeling the Rheological Dependence of Strain Partitioning in Oblique Wedges During Active Collision and "Post-Tectonic" Relaxation: EOS, Transactions, American Geophysical Union, 86 (52, Suppl.):, Fall AGU 2005.
- 32.) **Haq, S. S. B.**, and Davis, D. M., 2004, Understanding the Mechanics of Strain Partitioning in Frictional Oblique Wedges Using Quantified Analogue Models, Spring AGU 2004
- 33.) **Haq, S. S. B.**, and Davis, D. M., Geodetics in a sandbox; implications for measuring strain at convergent margins Eos, Transactions, American Geophysical Union, 83(47, Suppl.):F366, November 2002
- 34.) **Haq, S. S. B.**, and Davis, D. M., and Holt, W. E., Modeling independent aspects of strain partitioning at obliquely convergent margins, Eos, Transactions, American Geophysical Union, 79(45, Suppl.):848, November 1998
- 35.) Davis, D. M., Bernard, M., Holt, W. E., and **Haq, S. S. B.**, The complex relationship between plate convergence and fold-belt geometry; examples from Pakistan. Eos, Transactions, American Geophysical Union, 79(17, Suppl.):350, April 1998
- 36.) **Haq, S. S. B.**, and Davis, D. M., and Mutter, D. M., Role of terranes in oblique margin strain partitioning. Eos, Transactions, American Geophysical Union 78(17, Suppl.):320, April 1997
- 37.) D. M. Davis, **S. S. B. Haq**, M. Bernard, and Holt W. E., Strain partitioning in the structures, seismicity, and tectonics of western Pakistan. Eos, Transactions, American Geophysical Union, 78(17, Suppl.):320, (April 1997)
- 38.) **Haq, S. S. B.**, and Davis, D. M., and Holt, W. E., Oblique convergence; modeling examples in Pakistan, Eos, Transactions, American Geophysical Union, 76(46, Suppl.):567, (November 1995)
- 39.) **Haq, S. S. B.**, and Davis, D. M., and **Holt, W. E.**, Oblique convergence and strain partitioning in Pakistan; finite element and mechanical analog modeling. Eos, Transactions, American Geophysical Union, 76(17, Suppl.):280, April 1995.

SERVICE

Student Committees

Christie Lindemann MS
Tonya Richardson MS
Juan Herrera Ph.D.
Julie Bell Ph.D.

Faculty Advisor - Purdue Undergraduate Geology Club (PUGS), 2011 to Present.

Other Activities

Workshop Organizer on Analog Modeling, NSF Funded Analog Modeling of Tectonic Processes Workshop, May 13-15 2015, Amherst, Massachusetts

Purdue IMPACT Fellow, 2014

Workshop Organizer on Analog Modeling, NSF Funded Structural Geology and Tectonics Forum UMASS Amherst June 2012

AGU Session Convener

Mechanics of Obliquely Convergent and Divergent Deformation I and II

Posters^[1]_[SEP]Convener(s): **S S. Haq** and C. Andronicos, American Geophysical Union, Fall Meeting 2012, T31F and T33F.

Advances in 2-D and 3-D Numerical and Analog Modeling of Mountain Building and Plate Deformation American Geophysical Union, Fall Meeting 2010, Convener(s): M L Cooke, L Cruz, **S S Haq**, T52A, T53A

Graduate Students Advised

Current:

Patrick Newman – Ph.D

Former:

Russell Martin - M.S. - Spring 2013

Kelvin Koster – M.S. (co-advised with Dr. Flesch) - Spring 2013

Kim Davis (co-advised with Dr. Ridgway) M.S