

## CONTENTS

COSMOS at the Frontier of Strong-Motion Monitoring .....	1
Report from the Director of Engineering Applications .....	1
Update on Developments and Newly Available Strong Ground Motion Data at the VDC .....	2
Report of the International Committee .....	2
2012 COSMOS Technical Session.....	3
2012 Bolt Medal Awarded to Norman Abrahamson ..	3
List of COSMOS Publications .....	5
List of Officers.....	6

## CALENDAR

COSMOS attending the 15th World Conference on Earthquake Engineering, Lisbon, Portugal, September 23-28, 2012.

Strong-Motion Forum: Rm. 1.08, Tuesday, September 25, 5:15-8:15 pm, Lisbon Congress Center

Annual Meeting/Technical Session: 8:30 AM - 5:00 PM, November 16, 2012, Hilton Garden Inn, Emeryville, California.

Claire M. Johnson, Editor

# COSMOS Newsletter

No. 19, September 2012



Consortium of Organizations for Strong-Motion Observation Systems

---

---

## COSMOS AT THE FRONTIER OF STRONG-MOTION MONITORING

*W. D. Iwan, President*

The effects of strong earthquakes are a worldwide problem. Recent earthquakes and associated tsunamis have had a large impact on the people of the world. Efforts are underway to minimize these impacts through better planning, construction, and early warning capabilities. But these efforts cannot succeed without a thorough understanding of the ground motion itself. The Consortium of Strong Motion Observation Systems (COSMOS) is dedicated to achieving this understanding and making the results generally available. The current active participants in COSMOS include the major earthquake monitoring and archiving agencies and organizations in the United States, and connections have been established with many foreign organizations as well. We have developed standards and guidelines for the selection of strong-motion instruments, procedures for the deployment of instruments, and the analysis of strong-motion data. COSMOS also provides leadership in the archiving of strong-motion data that is made accessible worldwide. The organization consists of a Board of Directors, a staff, and several committees that are heavily involved in the activities of the organization.

COSMOS is currently emphasizing expansion of its international base by reaching out to interested organizations worldwide. We welcome inquiries from any organizations as to how we might expand and improve our cooperation. We seek to work with other organizations to provide an open and easily accessible archive of worldwide strong-motion data and to refine the procedures used in the selection and deployment of strong-motion instruments. We look forward to establishing new partnerships with active strong-motion programs.

---

---

## REPORT FROM THE DIRECTOR OF ENGINEERING APPLICATIONS

*Bob Bachman*

The 2011 Annual Meeting and Technical Session took place at the Hilton Garden Inn in Emeryville, California, on 4 November of last year. The COSMOS Annual Meeting took place noon and adjourned at 1:15 PM. The Technical Session was developed by Norman Abrahamson and myself, and was co-sponsored by the Pacific Earthquake Engineering Research Center (PEER) and the California Geological Survey (CGS). The theme of the session was titled, "Ground Motions from Subduction Earthquake and Issues for Seismic Design." We had approximately 95 attendees at the Technical Session and it was well received.

This year's Annual Meeting and Technical Session will again be held at the Hilton Garden Inn in Emeryville, California, on Friday, 16 November. The title of the 2012 Technical Session is "Issues Associated with Adjusting NGA Ground Motion Prediction Equations for Directivity and Fling, and Short-Term Impacts of Serious Aftershocks on Building Code Ground Motions." Details regarding the Technical Session and program are provided on Page 3. This year's Technical Session is again being co-sponsored by the PEER and the CGS. We are grateful for their support.

Last year's Board of Director election of a new board member resulted in a tie vote between Alan Yong and C.B. Crouse. The Board decided to seat both of these excellent candidates on the COSMOS Board. Both will be serving three-year terms.

*continued page 2*

---

---

**COSMOS**  
c/o UCB, Bldg. 454, Rm. 121  
1301 South 46th St.  
Richmond, CA 94804-4698

Tel: (510) 665-3437  
Fax: (510) 665-3456  
Email: [cosmos@berkeley.edu](mailto:cosmos@berkeley.edu)  
Website: <http://www.cosmos-eq.org>

The conversion and linkage of the COSMOS VDC to the CESMD has been finally completed and links to worldwide strong ground motions that have been measured over the past four years are in the process of being loaded. This is very exciting news. We are now also beginning the planning of tools that can be incorporated to enhance the usability of the VDC by engineers and scientists.

COSMOS will be sharing an exhibit booth with CUREE at the 15th World Conference on Earthquake Engineering (15WCEE) in Lisbon, Portugal, September 24–28. Claire Johnson will be our booth representative in Lisbon. The COSMOS will also sponsoring a Special Session at the 15WCEE organized by Jamie Steidl (COSMOS), Hamid Haddadi (CGS), and Christopher Stevens (USGS). Details regarding the Special Session are provided on this page.

---

---

## UPDATE ON DEVELOPMENTS AND NEWLY AVAILABLE STRONG GROUND MOTION DATA AT THE VDC

*Hamid Haddadi, California Geological Survey  
Christopher D. Stevens, U.S. Geological Survey*

The transfer of the operational and maintenance responsibilities of the Consortium of Organizations for Strong-Motion Observation Systems (COSMOS) Virtual Data Center (VDC) from the University of California, Santa Barbara (UCSB), to the Center for Engineering Strong Motion Data (CESMD) is complete. The current home webpage for the new VDC site ([www.strongmotioncenter.org/vdc](http://www.strongmotioncenter.org/vdc)) preserves much of the look and feel of the former site at UCSB, but efforts are underway to update, re-organize, and simplify this page. The web pages for searching by earthquake, by station, or by record parameters remain largely unchanged.

The VDC database has been updated with strong ground motion data for earthquakes that have occurred since 2007 in U.S. and New Zealand. The original strong-motion data in local seismic networks formats were converted into the VDC XML format for loading parametric data into the VDC database. These data include U.S. Geological Survey's NSMP data in SMC format, California Geological Survey's CSMIP data in CGS format, New Zealand GNS Science data in GNS format, and Southern California Seismic Network, Northern California Seismic Network, and Berkeley Digital Seismic Network data in COSMOS format.

Records of 23 U.S. and 22 New Zealand earthquakes that occurred from 2007 to 2012 were recently added to the VDC database. These additions include: 4 April 2010 Sierra El Mayor (close to the U.S. border, Mw7.2) in Mexico; 23 August

2011 Mineral, Virginia (Mw5.8) in the U.S.; 3 September 2010 Christchurch (7.0Mw), and 21 February 2011 Darfield (Mw6.3) in New Zealand.

The number of earthquakes for which strong-motion data are available through the VDC has increased from 199 earthquakes in 2001 to 663 in 2012. As of mid-September 2012, more than 47,000 accelerograms are available through the VDC, and more will be added later this year.

The development of software to convert the strong-motion record information of the Japan K-NET and KiK-net networks to the VDC XML format for uploading to the database is nearing completion. Because K-NET and KiK-net data were recently migrated to a new server, the CESMD and COSMOS have been working with Japan National Research Institute for Earth Science and Disaster Prevention (NIED) to establish new protocols for accessing the K-NET and KiK-net data for updating metadata to the VDC database. When the process is completed, the significant strong-motion data of Japan since 2007 will be available to view/download through the VDC portal. It is important to note that users need to register in advance at the NIED website (<https://hinetwww11.bosai.go.jp/nied/registration/?LANG=en>) to get a username and password in order to access the Japan data through VDC.

In order for metadata from other seismic networks to be uploaded to the VDC, the data must first be converted to COSMOS format. For example, the Italian Accelerometric Archive (ITACA) has already developed a tool to convert ITACA data to the COSMOS format. The CESMD will continue to work with ITACA to finalize the converter and transfer parametric data from ITACA strong-motion records to the VDC database.

COSMOS will continue to serve as an advocate to promote and solicit international cooperation in the exchange of strong ground motion data. To this end, COSMOS will host a special session entitled "Strong-Motion Networks and Virtual Data Dissemination through COSMOS" at the 15th World Conference on Earthquake Engineering, September 24–28, Lisbon, Portugal. At this forum, CESMD and COSMOS staff will communicate to international networks the need for developing converters to COSMOS format to facilitate uploading of important data to the VDC.

---

---

## REPORT OF THE INTERNATIONAL COMMITTEE *Jamison Steidl, COSMOS*

Following on the successful forum at the 2011 IAEE/IASPEI International Symposium on the Effects of Surface Geology on Strong Ground Motion (ESG), the COSMOS International Committee will hold its next strong-motion forum at the 15th

*continued page 3*

World Conference on Earthquake Engineering (15WCEE) in Lisbon, Portugal. The objectives of this forum are as follows: (a) to increase the visibility of COSMOS to the international earthquake engineering community; (b) to increase the communication and collaboration between COSMOS and the various strong-motion network operators around the globe; and (c) to discuss how COSMOS can facilitate access to data through the Virtual Data Center (VDC). Along with the strong-motion forum at the 15WCEE, COSMOS is also planning to host an exhibitor's booth, with the goal to increase our visibility to the international community.

The 15WCEE strong-motion forum agenda includes: (a) short presentations from worldwide strong-motion data providers on current network status and data dissemination protocols; (b) an update from CGS and USGS personnel on the CESMD; and (c) updates to the COSMOS VDC. Following the updates, an open discussion on how COSMOS and the VDC can help provide access (virtual or hosted) to all international strong-motion data in a single search engine, while still preserving network affiliation to the data and giving each network recognition they deserve for providing the data. One of the outcomes of the forum will be a new working group on data dissemination protocols, and the addition of new members to the COSMOS International Committee.

---

---

## 2012 COSMOS TECHNICAL SESSION

*Bob Bachman, Director of Engineering Applications*

The 2012 Annual Meeting and Technical Session will be held at the Hilton Garden Inn in Emeryville, California, on Friday, 16 November 16. The Hilton Garden Inn is conveniently located at 1800 Powell Street, one block west of the I-80 Freeway. Also, there is a complimentary bus (called Emery Go-Round) that runs from the MacArthur BART Station to the Hilton Garden Inn (see [www.emerygoround.com](http://www.emerygoround.com) for schedule details). This year's Technical Session is again being co-sponsored by the Pacific Earthquake Engineering Center (PEER) and the California Geological Survey (CGS). Registration for the Technical Session will begin at 7:30 AM (coffee and pastries will be provided). The Technical Session will begin promptly at 8:30 AM and with a lunch break at 11:45 AM. The COSMOS Annual Meeting will start at 12:15 PM and adjourn around 1:00 PM. The Technical Session will then reconvene and end at 5:00 PM. As in previous years, it will then be followed by a no-host cocktail hour.

This year's Technical Session will focus on two subjects: The first subject deals with issues associated with adjusting the recently developed Next Generation Attenuation (NGA) ground motion prediction equations for directivity and fling when developing near-fault design ground motions. The second subject deals

with how those associated with developing building code design ground motion should react when serious aftershocks will likely be greater than current building code ground motions. This subject is of particular concern in moderate areas of seismicity such as Christchurch. As in years past, the last part of the Technical Session will include a lively panel session.

Registration fees are \$160 for COSMOS and PEER members and \$200 for nonmembers, which includes both lunch and refreshments. There is also a special reduced student rate of \$40. Complete program details and speakers for the COSMOS Annual Meeting and Technical Session should be available by late-September at the COSMOS website at [www.cosmos-eq.org](http://www.cosmos-eq.org).

---

---

## 2012 BOLT MEDAL AWARDED TO NORMAN ABRAHAMSON

*W. U. Savage*

Professor Bruce A. Bolt was recognized in his time by earthquake engineers and seismologists worldwide as the expert in engineering seismology. His PhD student, Dr. Norman Abrahamson, is now advancing the leading edge of the field and is arguably the world's foremost authority on engineering seismology.



Following his PhD in 1985, Abrahamson worked for several consulting companies and as an independent consultant, then joined Pacific Gas and Electric Company (PG&E) in 1996, where he is currently employed as Chief Scientist in the Geosciences Department. In parallel, he has consulted on many projects worldwide and, since 2003, serves as an Adjunct Professor of Civil Engineering at the U.C. Berkeley and Davis campuses. He is an active member of SSA, EERI, and COSMOS, and has held leadership positions on each organization's Board of Directors. Abrahamson authored with Bolt some of the pioneering papers to answer practical and significant engineering problems regarding seismic wave coherency and spatial variation of seismic wave forms, and also provided one of the first estimates of fault rupture velocity and direction, which has applications in directivity analyses. Abrahamson has become a leader in the development of ground-motion prediction equations (GMPEs) and in analyzing the statistical properties of peak parameters and their variability.

Abrahamson's strong leadership is due in good part to his rare ability to not only focus on resolving technical issues arising in

*continued page 4*

challenging, state-of-the-art projects, but also to recognize the need for changes in engineering practice and make them happen. He has improved regression procedures used in GMPE development, improved methods for spectral matching, and provided a verified Probabilistic Seismic Hazard Analysis (PSHA) code that is widely used in industry. This work has been part of his initiative to address practical issues of time-series selection and scaling in structural analysis. He has helped initiate and guide research efforts that directly impact engineering seismological practice, including the PG&E Lifelines, NGA-West, and NGA-East programs at PEER, and the Extreme Ground Motion Program sponsored by the Department of Energy. Abrahamson has also provided essential technical leadership in two recent and significant ground-motion characterization studies using expert elicitation: the Yucca Mountain nuclear waste repository project and the Swiss PEGASOS project. Currently, he is the Technical Integrator for the SSHAC Level 3 PSHA studies for the Diablo Canyon Nuclear Power Plant and BC Hydro. In these and like projects, his direction is to “focus on what matters.”

Building understanding and improving communications between the seismological and engineering communities is an ongoing outcome of Abrahamson’s efforts. As an adjunct professor and a guest lecturer, he has been teaching classes on strong-motion seismology and PSHA with the particular goal of preparing the next generation of engineering seismologists and earthquake engineers, thereby improving the health of the engineering seismology profession itself. He takes an active role in educating current practitioners and frequently speaks at public conferences and private meetings where he focuses on PSHA and the proper use of strong ground-motion data.

Abrahamson will be presented with his award at the COSMOS Annual Meeting and Technical Session on 16 November 2012 at the Emeryville Hilton Garden Inn.

---

---

## Board of Directors Update and Election

*Bob Bachman, Director of Engineering Applications*

COSMOS Board of Director elections will soon be underway by mail vote with ballots due by end of October 26th. The new COSMOS Board of Directors will begin their term office the day before the 2012 Annual Meeting. The 2012 COSMOS Annual Business Meeting will be held immediately following lunch at the COSMOS Technical Session, which is being held at the Hilton Garden Inn in Emeryville, California, on Friday, 16 November 2012.

The COSMOS Board of Directors consists of four (4) core representative members (who are not elected) and seven (7) members who are elected by the membership. The newly elected

members have three-year terms of office. The six (6) elected members have staggered terms so that each year only two members are elected. The candidates were chosen by a nominating committee consisting of John Parrish, Woody Savage, and Bob Bachman, and the nominations were confirmed by the current COSMOS Board of Directors. The candidates for this year are Bill Iwan and Bob Nigbor, who are being nominated for a second term. Returning elected board members are Donald Wells, Jamie Steidl, Doug Dreger, C.B. Crouse, and Alan Yong. Returning Core representative Board members are John Parrish representing CGS, Woody Savage representing USGS, Don Yule representing USACE-ERDC and Dan Levisch, representing the U.S. Bureau of Reclamation.

COSMOS has four officers. These are the President, Vice President, Secretary and Treasurer. These officers are elected by the Board of Directors. Our current officers are Bill Iwan, President, Woody Savage, Vice President, Jamie Steidl, Secretary, and Donald Wells, Treasurer.

We welcome your continued support and request your full participation in these elections.

**JOIN COSMOS NOW!**

**Go to [www.cosmos-eq.org](http://www.cosmos-eq.org)  
and pay using PayPal**

**Individual membership:  
\$50.00 U.S.**

**Email: [cosmos@berkeley.edu](mailto:cosmos@berkeley.edu)  
<http://www.cosmos-eq.org>**

# COSMOS PUBLICATIONS

Proceedings, Recommended Guidelines, Instrumental Systems for Diagnostics of Seismic Response of Bridges and Dams, Eds. B. A. Bolt, G. Fenves, W. D. Iwan, A. F. Shakal, and C. M. Johnson, *COSMOS Publication No. CP-2001/01*, January 2001, Richmond, Calif.

Guidelines for Installation of Advanced National Seismic System Strong-Motion Reference Stations, R. L. Nigbor, J. Carl Stepp, and A. F. Shakal, *COSMOS Publication No. CP-2001/02*, July 2001, Richmond, Calif.

Proceedings, Workshop on Archiving and Web Dissemination of Geotechnical Data, Eds., J. Swift, J. Carl Stepp, C. Roblee, L. Turner, C. Real, W. U. Savage, and C. M. Johnson, *COSMOS Publication No. CP-2001/03*, October 2001, Richmond, Calif.

Proceedings, Workshop on Strong-Motion Instrumentation of Buildings, Eds., J. Carl Stepp, R. L. Nigbor, and C. M. Johnson, *COSMOS Publication No. CP-2001/04*, November 2001, Emeryville, Calif.

Proceedings, International Workshop for Site Selection, Installation, and Operation of Geotechnical Strong-Motion Arrays, Workshop 1: Inventory of Current and Planned Arrays, Eds. P. de Alba, R. Nigbor, J. H. Steidl, and J. Carl Stepp. *COSMOS Publication No. CP-2004/01*, October 2004, Los Angeles, Calif.

Proceedings, International Workshop on Strong-Motion Record Processing, Eds. D. M. Boore, B. S.-J. Chiou, W. D. Iwan, D. R. O'Connell, A. F. Shakal, J. Carl Stepp, and C. M. Johnson, *COSMOS Publication No. CP-2004/02*, May 2004, Richmond, Calif.

Proceedings, National Geotechnical Management Workshop, Archiving and Web Dissemination of Geotechnical Data, Eds. J. Carl Stepp, and C. M. Johnson, *COSMOS Publication No. CP-2004/03*, June 2004, Newport Beach, Calif.

Guidelines, Explanatory Notes on the COSMOS Guidelines for Strong-Motion Recording Processing, J. Bommer and D. Boore, *COSMOS Publication No. CP-2005/01*, Richmond, Calif.

Final Report, Effects of Strong-Motion Processing Procedures on Time Histories, Elastic, and Inelastic Spectra, by P. Bazzurro et al., eds. W. U. Savage, J. Carl Stepp, and C. M. Johnson, *COSMOS Publication No. CP-2005/02*, Richmond, Calif.

Proceedings, International Workshop for Site Selection, Installation, and Operation of Geotechnical Strong-Motion Arrays, Workshop 2: Guidelines for Installation, Operation, and Data Archiving and Dissemination, eds. P. de Alba, R. Nigbor, J. H. Steidl, J. Carl Stepp, and C. M. Johnson, *COSMOS Publication No. CP-2006/01*, May 2006, Lo Jolla, Calif.

Summary, Annual Meeting and Technical Session, 2004-2009, J. Watson-Lamprey, *COSMOS Publication No. CP-2010/01*, Richmond, Calif.

COSMOS Strong-Motion Standards and Guidelines, Version 1.0, COSMOS Standards Committee, A. Shakal, Ed., *COSMOS Publication No. CP-2011/01*, Richmond, Calif.

## **Board of Directors**

President: W. D. Iwan\*

Vice-President: William U. Savage

Secretary: Jamison Steidl

Treasurer: Donald Wells

C.B. Crouse

Douglas Dreger

Daniel Levisch

Robert L. Nigbor

John Parrish

Alan Yong

Donald Yule

\*Chair of General Membership

**Director of Engineering Applications: Robert E. Bachman**

COSMOS

Bldg. 454, Rm. 121

1301 South 46th Street

Richmond, CA 94804-4698

Tel: 1-510-665-3437

Fax: 1-510-665-3456

Email: [cosmos@berkeley.edu](mailto:cosmos@berkeley.edu)

<http://www.cosmos-eq.org>