



**Western States Seismic Policy Council
2018 Lifetime Achievement Award
Donald Thomas, Ph.D.**



Donald Thomas, Ph.D., is the Director of the University of Hawaii (UH) at Hilo's Center for the Study of Active Volcanoes (CSAV) as well as a long-standing member of the Hawaii Earthquake and Tsunami Advisory Committee (HETAC). For many years, Dr. Thomas has been doing the work necessary to keep people and the government fully educated and engaged – from scientific inquiry and research, to training and outreach, to undergraduate education – in hazards, mitigation, and monitoring of seismic activity. His dedication to the work has changed the way responders, builders, scientists, policy makers and the general public view, prepare for and respond to earthquakes.

A noteworthy example of his tireless efforts to promote hazard mitigation and awareness in Hawaii is making home earthquake retrofits accessible to homeowners. Don and his students took the detailed and complex designs for retrofitting post-and-pier foundations of homes damaged in the Kiholo Bay earthquake in 2006 and developed an online expert system that walked the homeowner step-by-step through the retrofit selection process. Based on identifying key elements of construction types, the expert system would determine the appropriate retrofit system, output construction drawings that homeowners or contractors could use to implement the retrofit, and provide a shopping list of hardware required to install the retrofit.

His work on seismic research, mitigation programs, and information dissemination has been built on collaboration with the UH Hilo Department of Geology, UH Manoa, the U.S. Geological Survey, the USGS Hawaiian Volcano Observatory, the Hawai'i Department of Defense, the Hawai'i Emergency Management Agency, the State Hazard Mitigation Forum, the State Lava Flow Mitigation Plan Advisory Committee, and the Hawai'i State Earthquake and Tsunami Advisory Committee – illustrating a hallmark of an effective leader: collaboration.



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DEPARTMENT OF DEFENSE
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December 8, 2017

Erin Mommsen, Program Manager
Western States Seismic Policy Council
801 K St.
Sacramento, CA 95814

Re: Nomination of Dr. Donald Thomas for the 2018 Western States Seismic Policy Council (WSSPC) Lifetime Achievement Award

This letter is sent to nominate Dr. Donald Thomas, Director of the University of Hawaii at Hilo's (UHH) Center for the Study of Active Volcanoes (CSAV), for the 2018 WSSPC Lifetime Achievement Award. The CSAV was instituted at the UHH in 1989, as a training and outreach program. Its mission is to provide information on volcanic, earthquake, and other natural hazards that occur in Hawaii and worldwide. It is a cooperative program of the UHH, the Hawaiian Volcano Observatory, and the University of Hawaii at Manoa. CSAV began operations in 1989. Dr. Thomas has worked at CSAV since its inception in 1989, became its Director in 1995, and has continued to serve in that capacity through the present. Dr. Thomas has degrees in Physics and Chemistry (B.A.) and Chemistry (M.S. and Ph.D.)

In Hawaii, volcano and earthquake hazards are inextricably linked, as Hawaii's earthquakes are related to volcanic processes. Magma movement causes small earthquakes, including volcanic tremor. Tectonic earthquakes, which are larger and more likely to be destructive, are indirectly related to volcanic activity; these originate along faults beneath the volcanoes. Mantle earthquakes are caused by bending the lithosphere under the weight of the islands, from the buildup of millennia of eruptions.

As Director of the CSAV, Dr. Thomas combined his expertise in science and teaching to translate and share the work of scientists with educators, students, government agencies, and the citizenry at large. It is of critical importance that the work of scientists be developed into outreach and educational programs that are disseminated to the many components of the community. Dr. Thomas has provided consistent and dedicated public service in this regard throughout his career. His service extends beyond that of the CSAV, as he has provided assistance and advice to many individuals and public agencies in the nuances of promoting public awareness of natural hazards. His teaching and outreach on awareness and mitigation of volcanic, earthquake, and other natural hazards has reached many thousands of people throughout State of Hawaii, the United States, and many countries, both directly and through the

training of teachers, students from the elementary to adult levels, international scientists and technicians, community groups, and government officials.

Dr. Thomas is a long-standing member of the Hawaii State Earthquake and Tsunami Advisory Committee (HETAC), established in 1990 under the auspices of the State of Hawaii's Department of Defense, Hawaii Emergency Management Agency, and which serves as Hawaii's seismic council. He has continuously served as a member of HETAC since 1998 through the present (19 years), serving as Committee Chair and Vice Chair, and Chair of the Subcommittee on Public Outreach. HETAC is comprised of volunteer members with expertise in, among other areas, earthquake science, engineering, hazard mitigation, planning, and emergency management.

In HETAC's practice, the goals of (1) promotion of cooperation amongst the scientific and engineering communities and state and county civil defense agencies, (2) overall awareness of earthquake hazards and mitigation, and earthquake studies to protect life and property, (3) service as a resource regionally and nationally, and (4) advocacy for adoption of earthquake policies at all levels of government are promoted.

The following are representative of Dr. Thomas' lifetime contributions to earthquake and volcanic hazard mitigation.

Post-and-Pier Project (2010-Present)

This project surveyed damage to post-and-pier homes on the Big Island, as well as typical post-and-pier construction, after the 2006 Kiholo Bay Earthquake. Two structural engineers conducted the survey. They analyzed typical building layouts to determine the level of retrofit required, based on building location, size and slope of the lot. The result was a report that indicated what retrofit (adding straps to existing framing; adding plywood shear walls; or adding CMU shear walls) would be required for a particular house.

When the report was completed in 2009, Dr. Thomas understood that it would be much easier for the public to use if it was presented as an online expert system. He worked with two students at the UHH to code the software required to generate an online tool. This resulted in a fully functional online tool that any homeowner can use to determine the appropriate retrofit for their home. The software would provide drawings that could be submitted for permit applications, and a full shopping list of straps, connectors and fasteners needed to perform the retrofit work. The online tool is hosted on CSAV's website and is incorporated in its seminars. The online tool is the subject of CSAV's video, "How to Build Shear Wall Foundations", which can be viewed on *You Tube*.

ATC-20 Training (2006)

Dr. Thomas was instrumental in facilitating the planning for ATC-20 training (Post-Earthquake Safety Evaluation of Buildings) in the State of Hawaii in 2006, which took place only months prior to the 2006 Kiholo Bay Earthquake. The ATC-20 seminars provided training to county building officials, structural engineers, and emergency managers. This training facilitated the inspection of buildings affected by the earthquake.

Teacher Training for the Western States (1994 onwards)

The National Science Foundation provided funding for the development and implementation of training K-12 teachers from Hawaii, Alaska, California, Oregon, and Washington states to learn about volcanoes, geology, and earthquakes, through Seismic Sleuth and Tremor Troops publications, classroom, laboratory, and fieldwork. Dr. Thomas proposed five educational projects, all of which were funded, and resulted in:

- (a) *Earthquake and Volcano Hazards on the Island of Hawaii*: a 30-minute video was produced portraying local families preparing for earthquakes. These went to schools, libraries, and video outlets; the video plays in four parts on the CSAV *You Tube* channel, with combined hits totaling in the thousands.
- (b) *Teacher Training*: K-12 level teachers learned about earthquake, volcano, tsunami, and hurricane hazards and how to apply that knowledge and the material in the classroom.
- (c) *Countywide Hazard Awareness Road Show*: CSAV visited communities throughout the County of Hawaii, with presentations tailored to the specific hazards in each community and how to prepare for them.
- (d) *Hilo Natural Hazard Seminars*: this included speakers from throughout the State who spoke on their respective hazard, including earthquake, volcano, tsunami, hurricane, flash flood, and brush fire hazards.
- (e) *School Visits*: this highly successful and ongoing-to-the-present-day project involved at the start, models of volcano models, tsunami wave tanks, and earthquake demonstrations. Initially 4th, 6th, and 8th graders throughout the County of Hawaii were taught. Over time, almost all of the grade levels are included in the program. CSAV works with the State Department of Education on this. Public and private schools are involved. CSAV works with many sister agencies, which provide educational materials, including the International Tsunami Information Centre and the Hawaii Coastal Zone Management Program.

International Training

International Program in Volcano Monitoring (1990-Present)

Dr. Thomas works hands-on at this CSAV Program which assists developing nations in attaining self-sufficiency in monitoring volcanoes. The field training emphasizes volcano-monitoring methods (data collection and interpretation) in use by the U.S. Geological Survey. Participants are taught the use and maintenance of volcano monitoring instruments, how to assess volcanic hazards, as well as the interrelationship of scientists, governing officials, and the news media during volcanic crises. They are taught public outreach methods, including earthquake safety in buildings. This program enables scientists to address volcanic crises in their respective countries and keep people safe from the dangers of active volcanoes.

Over 200 scientists and technicians have attended this Program since 1990. Participating nations include Papua New Guinea, Mexico, Mariana Islands, Italy, Canary Islands, Cape Verde, Indonesia, Philippines, Democratic (Republic of Congo), Costa Rica, Republic of Vanuatu, Solomon Islands, China, Peru, Nicaragua, Trinidad, Republic of Cameroon, Australia, Russia, Columbia, Canada, Saudi Arabia, and Korea.

Cities on Volcanoes 3 Conference (2003)

Dr. Thomas contributed to the planning, presentations, and execution of this major volcanic conference, which served as an international forum for specialists in every area concerned with natural hazards to discuss the impacts of volcanic activity on society. It brought together workers who share common interests (science, hazards management, social services) but who historically have had limited interactions with each other. As a result, collaborations were established for work in emergency management, urban and rural planning, education, volcanology, sociology, and psychology.

Ongoing Commitment to Community Outreach

Under Dr. Thomas, CSAV maintains an ongoing commitment to community outreach that addresses earth sciences through natural hazards awareness. It is a multi-level outreach program that includes classroom visits to most of the public and charter schools on the island. During the classroom visits, presentations are made on earthquakes and earthquake hazards, eruptions and lava flow hazards, tsunami hazards, and hurricane hazards. Dr. Thomas provides direction to CSAV staff in development of the presentations and work with them to keep the programs current and relevant to ongoing events on the Big Island.

CSAV also participates in on-campus science outreach programs as well as community events including County Fairs, Builder's Expos, and outreach programs sponsored by the Structural Engineers Association of Hawaii in Kona and Hilo. For these events, CSAV provides a natural hazards booth with information on Big Island hazards and recommended mitigation strategies that homeowners/residents can take to minimize the threat of these hazards.

Hawaii Scientific Drilling Project

In addition to CSAV's work, Dr. Thomas' projects and interests include the Hawaii Scientific Drilling Project, which includes a continuously cored borehole into Mauna Kea volcano to a planned depth of at least 4.5 km. Scientific interests in the project revolve around hydrology of large volcanic/ocean islands and fluid transport and water-rock reactions occurring below the shallow basal freshwater lens. Other research interests include the study of radon release and transport in the vadose zone as an analog of volatile contaminant transport and as it relates to earthquake precursory phenomena; and the geochemistry of ocean island hydrothermal systems.

List of Affiliations

Hawaii State Earthquake & Tsunami Advisory Committee, (1998 – Present) served as Chair,

Vice Chair, and currently as Subcommittee Chair on Public Outreach

State Lava Flow Mitigation Advisory Committee, (2000-2002)

State Hazard Mitigation Forum, (2000-2016)

Hawaii Energy Forum, (2000 -)

Mauna Kea Environmental Advisory Committee (2005 -)

Geothermal Direct Use Working Group (2004-2006)

State Natural Energy Laboratory of Hawaii Authority: (1991 -) served as Chair of the Research Advisory Committee of the Board of Directors

These major accomplishments and affiliations have benefited the WSSPC community, as WSSPC shares the same goals as HETAC, and the work of HETAC is shared with WSSPC on a regular basis, including at the annual WSSPC Earthquake Program Managers' Meetings.

Based on the above, we respectfully nominate Dr. Donald Thomas, for the 2018 WSSPC Lifetime Achievement Award.

Sincerely,



VERN T. MIYAGI
Administrator of Hawaii Emergency Management Agency

Kevin Richards, HI-EMA
Ann Ogata-Deal, HETAC Member (2003-present)



UNIVERSITY
of HAWAII®
MĀNOA

Department of Civil and Environmental Engineering
College of Engineering

January 2, 2018

Kevin Richards
Earthquake and Tsunami Coordinator
Hawaii State Civil Defense

RE: Nomination of Donald Thomas for WSSPC Life Time Achievement Award

Dear Kevin,

It is with great pleasure that I write this letter of recommendation for Don Thomas's nomination for the WSSPC 2018 Life Time Achievement Award. I have known Don for many years, primarily through his numerous contributions to the work of the Hawaii State Earthquake Advisory Committee, HSEAC, and later the Hawaii State Earthquake and Tsunami Advisory Committee, HETAC.

Don is an ideal candidate for the WSSPC Life Time Achievement Award. For as long as I can remember, Don has chaired the outreach sub-committee of HSEAC and now HETAC. He has worked tirelessly to promote earthquake and tsunami preparedness to communities throughout Hawaii, and is always first to respond to requests for assistance at open house, community awareness, and other outreach activities.

At the same time, Don has been an active researcher in his University of Hawaii position as Director of the Center for the Study of Active Volcanoes, CSAV, in the Hawaii Institute for Geophysics and Planetology, HIGP, under the School of Ocean and Earth Science and Technology, SOEST. He has also collaborated extensively with faculty at the University of Hawaii at Hilo campus on various projects related to earthquake mitigation and lava flow modeling.

I am particularly familiar with Don's efforts to establish an online expert system to enable homeowners in Hawaii to determine quickly and easily the level of retrofit required for their post-and-pier foundation system homes. This particular type of construction was very common in Hawaii until its poor seismic performance was identified in the 1980's and 1990's. There is still a large inventory of existing homes built using this sub-standard foundation system, similar to the cripple wall system common in older homes in California and other western states.

During the Kiholo Bay Earthquake of 2006, numerous post-and-pier foundation systems failed, causing significant damage to homes and their contents. I was involved in a FEMA funded study to design suitable retrofit approaches based on the building size, location, etc. Our final report provided the necessary retrofit designs, including construction drawings, but was unlikely to find much use because it was rather long and complex. Don Thomas took it upon himself to recruit two students in the Computer Science department at UH Hilo to work on a simpler way to

disseminate this retrofit information. Together, they developed an excellent online expert system that walked the homeowner step-by-step through the retrofit selection process with explanatory graphics, etc. so that the process was much simpler and more accessible than working through our final report. The expert system would then determine the appropriate retrofit system for the particular homeowner, output construction drawings that they or their contractor could use to implement the retrofit, and even provide a shopping list of hardware required to install the retrofit.

Because of his tireless efforts to promote hazard mitigation and awareness in Hawaii, I strongly support Donald Thomas's nomination for the 2018 WSSPC Life Time Achievement Award. There are very few individuals who have done as much to educate and enhance community preparedness and resilience for earthquakes, tsunamis and lava flow in the State of Hawaii.

Sincerely,

A handwritten signature in black ink that reads "Ian Robertson". The signature is written in a cursive style and is underlined with a single horizontal line.

Ian Robertson, Ph.D., S.E.
Arthur N.L. Chiu Distinguished Professor



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HILO

November 27, 2017

Kevin J. Richards
Natural Hazards Program Planner
Hawai'i Emergency Management Agency
3949 Diamond Head Road
Honolulu, HI 96816

Re: Nomination of Dr. Donald Thomas for the 2018 WSSPC Lifetime Achievement Award

Dear Kevin,

On behalf of the University of Hawai'i at Hilo, I am pleased to support the nomination of Dr. Donald Thomas for the 2018 Western States Seismic Policy Council (WSSPC) Lifetime Achievement Award.

On Hawai'i Island, we are no strangers to natural disasters. We live under the constant threat of tropical storms, hurricanes, tsunamis, flooding, wild fires, and volcanic activity. One result of living with an active volcano is experiencing constant tremors and earthquakes; there is seismic activity on a daily basis. And it is not unusual for strong earthquakes to hit, causing destruction to buildings and infrastructure, uprooting lives and creating hardship. One of the most effective people on the island in helping residents and government agencies deal with this real threat is Dr. Thomas, director of the UH Hilo Center for the Study of Active Volcanoes (CSAV). For many years, Dr. Thomas has been doing the work necessary to keep people and the government fully educated and engaged—from scientific inquiry and research, to training and outreach, to undergraduate education—in hazards, mitigation, and monitoring of seismic activity. His dedication to the work has changed the way responders, builders, scientists, policy makers and the general public view, prepare for and respond to earthquakes.

In some of his most important work, Dr. Thomas's research and outreach as director of CSAV has led to more proactive local homeowners in dealing with earthquake mitigation; more knowledgeable professionals and teachers on earthquake preparedness throughout Hawai'i, the U.S. continent, and the world; and better prepared international government agencies on mitigation and response to seismic activity. Thousands of people throughout the world have benefitted from Dr. Thomas's work.

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Letter of Support

In addition, Dr. Thomas understands that this kind of work takes immense coordination between government and other agencies in order to be effective. His work on seismic research, mitigation programs, and information dissemination has been built on collaboration with the UH Hilo Department of Geology, UH Mānoa, the U.S. Geological Survey, the USGS Hawaiian Volcano Observatory, the Hawai'i Department of Defense, the Hawai'i Emergency Management Agency, the State Hazard Mitigation Forum, the State Lava Flow Mitigation Plan Advisory Committee, and the Hawai'i State Earthquake and Tsunami Advisory Committee (member and chair)—illustrating a hallmark of an effective leader: collaboration.

Further the University of Hawai'i System, the National Science Foundation, the Federal Emergency Management Agency and other seminal institutions of education, science, and natural hazard management have supported his work.

I can't imagine a clearer example of a person successfully leading a unit in fulfilling its mission and I am proud to have Dr. Thomas and the Center for the Study of Active Volcanoes on the UH Hilo campus. Not only has this dedicated scientist and educator engaged and informed local residents and government agencies of the dangers, mitigation and proper response to the earthquakes we experience here on Hawai'i Island, but he also has shared his expertise with people and governments throughout the world where this natural hazard is found, changing lives and making governments more effective. The partnerships, educational programs, and scientific inquiries created by Dr. Thomas have affected thousands of people around the world who face the potential dangers of earthquakes. He has dedicated his life to bettering the lives of people in these populations and I can think of no one more deserving of this Lifetime Achievement Award.

Aloha,



Marcia Sakai
Interim Chancellor, UH Hilo