

**WILLIAM C. BURGESS, Ph.D.**  
**Senior Research Engineer**  
**Greeneridge Sciences, Inc.**

**Work:**

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**RESEARCH INTERESTS**

Acoustic investigation of wildlife, geophysics, and human activity from in-situ loggers and tags as well as from remote arrays; physiological and behavioral acoustics; autonomous low-power data-logging devices.

**EDUCATION**

**Ph.D.** *Electrical Engineering, Stanford University.* Experimental radio science and signal processing. 1993  
**M.S.** *Electrical Engineering, Stanford University.* Computer systems and networks. 1987  
**B.S.** *Electrical Engineering, Stanford University.* 1985

**DISSERTATION**

“Lightning-Induced Coupling of the Radiation Belts to Geomagnetically Conjugate Ionospheric Regions.” Documented the discovery that lightning flashes can induce the simultaneous precipitation of radiation belt electrons into localized, geomagnetically conjugate regions of the ionosphere. Showed for the first time that lightning could thus be responsible for the control of radiation belt electron populations. Published in *Geophysical Research Letters* and the *Journal of Geophysical Research*. Advisors: Dr. Umran S. Inan and Dr. Robert A. Helliwell.

**EMPLOYMENT HISTORY**

**Senior Research Engineer, Greeneridge Sciences, Inc.** 1998 – present  
Obtained Office of Naval Research (ONR) development support for, designed, constructed, and programmed two generations of miniature self-contained underwater acoustic recorders using ARM9 and 68EZ332 microprocessors, individual integrated circuits, and an original operating system (see details at <http://www.acousonde.com>). Supervised fabrication of small numbers of the device for commercial sale. Joined collaborative partnerships with field biologists to apply the device with blue, fin, and humpback whales off the California coast, with sperm whales in the Gulf of Mexico, and with northern fur seals in the Bering Sea. Recorded vessel, airgun, and pile-driving sounds using boat-based recording gear in Washington-State rivers, San Francisco Bay, the Beaufort Sea, the Gulf of Maine, and the Santa Barbara Channel. Deployed and recovered seafloor acoustic recording equipment from research and cable ships in the Beaufort Sea. Processed terrestrial and underwater acoustic data to determine exposure of protected species to sounds from jet aircraft, rockets, missiles, vessels, airguns, and pile driving. Authored reports to the National Marine Fisheries Service documenting client compliance with federal regulations. Installed and maintained router equipment and a Linux server for company-wide network services.

**Research Engineer, SRI International** 1996 – 1998  
Supervised development and field testing of a prototype optical system for sensing of vibration. Designed and tested photodiode amplifier electronics as part of this system. Developed image reconstruction software for hyperspectral data. Authored or co-authored four proposals to government clients, including ONR and the National Oceanographic Partnership Program.

**Postdoctoral Fellow, Monterey Bay Aquarium Research Institute** 1994 – 1996  
Designed, constructed and programmed a battery-powered acoustic/velocity/pressure/temperature logger based on an Onset Corp. “TattleTale 7” data acquisition platform. Deployments of the device on northern elephant seals obtained acoustic signatures of physiological and behavioral indicators, such as respiration, heartbeat, stroke rate, and possible vocalizations, that were difficult or impossible to measure with traditional methods.

**Postdoctoral Scholar, Woods Hole Oceanographic Institution** 1993 – 1994  
Analyzed backscattering behavior of deep ocean sediments at shallow grazing angles using monostatic data from an acoustic source and vertical hydrophone array towed at 4000-m depth. Field work included a month at sea obtaining the data over the Mid-Atlantic Ridge in conjunction with the ONR Acoustic Reverberation Special Research Project (ARSRP).

**Research Assistant, Space, Telecommunications & Radioscience Laboratory, Stanford University** 1985 – 1993  
Six months cumulative field experience installing, operating and maintaining VLF radio receivers and data acquisition equipment in Antarctica and northern Québec. Developed a digital Fourier algorithm to determine arrival azimuth of VLF signals as a function of time and frequency, leading to a new project to study the location and movement of thunderstorms using VLF radio. Selected, procured and installed computer and network hardware and software. Programmed Apple Macintosh to browse through time series data. Designed, constructed, and programmed digital broadband VLF data acquisition hardware using a 68000-based VMEbus prototyping board, and programmed a VAX/VMS system to analyze the acquired data and produce color spectrograms.

**C System Programmer and UNIX Manager, SUMEX-AIM, Stanford University** 9/81 – 6/85  
Wrote and maintained C language system software for a variety of platforms. From 5/84 to 6/85, responsible to a community of 100 people for software and hardware maintenance, user assistance and accounting on a Digital Equipment VAX 11/780 running Berkeley UNIX.

### PROFESSIONAL SOCIETIES

**American Geophysical Union (AGU)**

**Acoustical Society of America (ASA)**

**Institute of Electrical and Electronics Engineers (IEEE)**

**Society for Marine Mammalogy (SMM)**

### HONORS, AWARDS, AND PROFESSIONAL ACTIVITIES

<b>Session Chair, Tools for Animal Bioacoustics</b> , 149th meeting of the ASA (Vancouver)	2005
<b>Invited Participant, Schooling and Aggregation of Pelagic Fish</b> , Pelagic Fisheries Research Program	2002
<b>Invited Participant, Cetacean Audiometrics</b> , Edwin W. Pauley Summer Program in Marine Biology	2001
<b>Session Chair, Instrumentation for Animal Bioacoustics</b> , 140th meeting of the ASA (Newport Beach)	2000
<b>Invited Presenter, Marine Mammal Bioacoustics Short Course</b> , organized by the ASA	1999
<b>Invited Panelist, National Public Radio, "Talk of the Nation/Science Friday"</b> October 20, 1995	1995
<b>Postdoctoral Fellowship, Monterey Bay Aquarium Research Institute</b>	1994
<b>Postdoctoral Scholarship, Woods Hole Oceanographic Institution</b>	1993
<b>Elected to Sigma Xi, Stanford University Chapter</b>	1993
<b>Outstanding Student Paper Award, American Geophysical Union</b>	1991
<b>Antarctica Service Medal, National Science Foundation</b>	1988

### PUBLICATIONS

Insley, S. J., B. W. Robson, T. Yack, R. R. Ream, and W. Burgess, Acoustic determination of activity and flipper stroke rate in foraging northern fur seal females, *Endangered Species Research*, doi:10.3354/esr00050, 2007.

Meyer, C. G., W. C. Burgess, Y. P. Papastamatiou, and K. N. Holland, Use of an implanted sound recording device (Bioacoustic Probe) to document the acoustic environment of a blacktip reef shark (*Carcharhinus melanopterus*), *Aquatic Living Resources*, 20, doi:10.1051/alr2008002, 291–298, 2007.

Oleson, E. M., J. Calambokidis, W. C. Burgess, M. A. McDonald, C. A. LeDuc, and J. A. Hildebrand, Behavioral context of call production by eastern North Pacific blue whales, *Marine Ecology Progress Series*, 330, 269–284, 2007.

Thode, A. M., P. Gerstoft, W. C. Burgess, K. Sabra, M. Guerra, M. D. Stokes, M. Noad, and D. C. Cato, A portable matched-field processing system using passive acoustic time synchronization, *Journal of Oceanic Engineering*, 31, 696–710, 2006.

- Burgess, W. C., S. B. Blackwell, and R. Abbott, *Underwater acoustic measurements of vibratory pile driving at the Pipeline 5 crossing in the Snohomish River, Everett, Washington*, Greeneridge Rep. 322-2, Rep. from Greeneridge Sciences Inc., Santa Barbara, CA, for URS Corporation, Seattle, WA, and the City of Everett, Everett, WA, 35 pp., 2005.
- Burgess, W. C., and S. B. Blackwell, *Acoustic monitoring of barrier wall installation at the former Rhône-Poulenc site, Tukwila, Washington*, Greeneridge Rep. 290-1, Rep. from Greeneridge Sciences Inc., Santa Barbara, CA, for RCI Environmental Inc., Sumner, WA, 31 pp., 2003.
- Au, W. W. L., J. Mobley, W. C. Burgess, M. O. Lammers, and P. E. Nachtigall, Seasonal and diurnal trends of chorusing humpback whales wintering in waters off western Maui, *Mar. Mamm. Sci.*, 16, 530–544, 2000.
- Greene, C. R., Jr., and W. C. Burgess, Physical acoustic measurements, p. 3-1 to 3-45 In: W. J. Richardson (ed.), *Marine mammal and acoustical monitoring of Western Geophysical's open-water seismic program in the Alaskan Beaufort Sea, 1999*, LGL Rep. TA2313-4, Rep. from LGL Ltd., King City, Ont., and Greeneridge Sciences Inc., Santa Barbara, CA, for Western Geophysical, Anchorage, AK, and Nat. Mar. Fish. Serv., Anchorage, AK, and Silver Spring, MD, 155 p., 2000.
- Burgess, W. C. and C. R. Greene, Jr., Physical acoustics measurements. p. 3-1 to 3-65 In: W.J. Richardson (ed.), *Marine mammal and acoustical monitoring of Western Geophysical's open-water seismic program in the Alaskan Beaufort Sea, 1998*, LGL Rep. TA2230-3, Rep. from LGL Ltd., King City, Ont., and Greeneridge Sciences Inc., Santa Barbara, CA, for Western Geophysical, Houston, TX, and Nat. Mar. Fish. Serv., Anchorage, AK, and Silver Spring, MD, 390 p., 1999.
- Burgess, W. C., P. L. Tyack, B. J. Le Boeuf, and D. P. Costa, A programmable acoustic recording tag and first results from free-ranging northern elephant seals, *Deep-Sea Res. Part II*, 45, 1327–1351, 1998.
- Burgess, W. C., and U. S. Inan, The role of ducted whistlers in the precipitation loss and equilibrium flux of radiation belt electrons, *J. Geophys. Res.*, 98, 15643, 1993.
- Burgess, W. C., and U. S. Inan, Ducted whistlers and the burst loss of radiation belt electrons to geomagnetically conjugate ionospheric regions, *Antarctic J.*, 26, 309, 1991.
- Burgess, W. C., and U. S. Inan, Simultaneous disturbance of conjugate ionospheric regions in association with individual lightning flashes, *Geophys. Res. Lett.*, 17, 259, 1990.
- Burgess, W. C., and U. S. Inan, Simultaneous lightning-associated precipitation of radiation-belt electrons into the Northern and Southern Hemispheres, *Antarctic J.*, 24, 271, 1989.
- Inan, U. S., W. C. Burgess, T. G. Wolf, and D. C. Shafer, Lightning-associated precipitation of MeV electrons from the inner radiation belt, *Geophys. Res. Lett.*, 15, 172, 1988.

#### PAPERS PRESENTED AT SCIENTIFIC CONFERENCES

- Schorr, G. S., J. Calambokidis, E. M. Oleson, W. C. Burgess, M. A. McDonald, J. Francis, J. A. Goldbogen, J. A. Hildebrand, Comparisons of lunge feeding behavior between blue, fin, and humpback whales, paper presented at the Sixteenth Biennial Conference of the Society for Marine Mammalogy, San Diego, California, December 12–16, 2005.
- Burgess, W. C., M. T. Williams, and S. B. Blackwell, Miniature self-contained acoustic recorders applied in a survey of beluga-whale populations in Knik Arm, Alaska (abstract), *J. Acoust. Soc. Am.*, 117, 2524, 2005.
- Thode, A., and W. Burgess, Modular autonomous array deployments using passive acoustic time synchronization (abstract), *J. Acoust. Soc. Am.*, 117, 2525, 2005.
- Insley, S. J., B. W. Robson, and W. C. Burgess, Acoustic monitoring of northern fur seals in the Bering Sea (abstract), *J. Acoust. Soc. Am.*, 116, 2555, 2004.
- Calambokidis, J., E. M. Oleson, W. C. Burgess, M. A. McDonald, J. A. Hildebrand, Insights into underwater behavior and vocalizations of blue and fin whales from attachments of acoustic recording tags (abstract), *J. Acoust. Soc. Am.*, 116, 2613, 2004.
- Thode, A. M., P. Gerstoft, M. Guerra, D. M. Stokes, W. C. Burgess, M. J. Noad, and D. H. Cato, Range-depth tracking of humpback whales using autonomous acoustic recorders (abstract), *J. Acoust. Soc. Am.*, 116, 2589, 2004.
- Thode, A. M., J. M. Straley, T. M. O'Connell, and W. C. Burgess, Acoustic observations of longline depredation by sperm whales (abstract), *J. Acoust. Soc. Am.*, 116, 2614, 2004.

- Calambokidis, J., E. Oleson, M. McDonald, B. Burgess, J. Francis, G. Marshall, M. Bakhtiari, and J. Hildebrand, Feeding and vocal behavior of blue whales determined through simultaneous visual-acoustic monitoring and deployment of suction-cup attached tags, paper presented at the Fifteenth Biennial Conference of the Society for Marine Mammalogy, Greensboro, North Carolina, December 14–19, 2003.
- Burgess, W. C., A general-purpose acoustic recording tag for marine wildlife (invited abstract), *J. Acoust. Soc. Am.*, *110*, 2722–2723, 2001.
- Burgess, W. C., The Bioacoustic Probe: a miniature acoustic recording tag, poster paper presented at the Fourteenth Biennial Conference of the Society for Marine Mammalogy, Vancouver, BC, November 29–December 3, 2001.
- Burgess, W. C., The Bioacoustic Probe: a miniature acoustic recording tag, paper (verbal only) presented at the Oceans 2001 meeting of MTS/IEEE, November 7, 2001.
- Burgess, W. C., The Bioacoustic Probe: a general-purpose acoustic recording tag (invited abstract), *J. Acoust. Soc. Am.*, *108*, 2583, 2000.
- Burgess, W. C., W. W. L. Au, J. Mobley, M. O. Lammers, P. E. Nachtigall, Seasonal and diurnal trends of chorusing humpback whales wintering in waters off west Maui, paper presented at the Thirteenth Biennial Conference of the Society for Marine Mammalogy Wailea, Maui, November 29–December 3, 1999.
- Burgess, W. C., P. L. Tyack, B. J. Le Boeuf, and D. P. Costa, A programmable acoustic recording tag and first results from free-ranging northern elephant seals, paper presented at the World Marine Mammal Science Conference, Monaco, January 20–24, 1998.
- Burgess, W. C., P. L. Tyack, B. J. Le Boeuf, D. P. Costa, and D. E. Crocker, A microprocessor-based tag to record acoustics experienced and generated by migrating northern elephant seals (abstract), *J. Acoust. Soc. Am.*, *102*, 3197, 1997.
- Burgess, W. C., P. L. Tyack, B. J. Le Boeuf, and D. P. Costa, Acoustic measurement of cardiac function on northern elephant seals (abstract), *J. Acoust. Soc. Am.*, *100*, 2709, 1996.
- Le Boeuf, B. J., D. P. Costa, P. L. Tyack, S. Fletcher, and W. Burgess, Onboard acoustic recording from diving elephant seals, paper presented at the V European Conference on Wildlife Telemetry, Strasbourg, France, August 25–30, 1996.
- Le Boeuf, B. J., D. P. Costa, P. L. Tyack, S. R. Fletcher, and W. C. Burgess, Onboard acoustic reporting from diving elephant seals, paper presented at the XXIV International Ethological Conference, Honolulu, Hawaii, August 12, 1995.
- Burgess, W. C., P. L. Tyack, B. J. Le Boeuf, and D. P. Costa, Measuring in-situ environmental and physiological acoustics of marine animals: first results from an autonomous broadband recording tag, substitute paper 4aAB10 presented at the 129th meeting of the Acoustical Society of America, Washington, DC, June 2, 1995.
- Burgess, W. C., G. V. Frisk, and C. J. Sellers, The influence of sediment cover on low-frequency reverberation from deep ocean bedrock, paper presented at the Spring Symposium of the ONR Acoustic Reverberation Special Research Project (ARSRP) Cambridge, Massachusetts, June 5, 1994.
- Burgess, W. C., and U. S. Inan, On the role of ducted whistlers in lightning-induced electron precipitation (abstract), *EOS Trans. AGU*, *72*, 399, 1991.
- Burgess, W. C., and U. S. Inan, Simultaneous disturbance of conjugate ionospheric regions by whistler-induced electron precipitation, paper presented at the International Union of Geodesy and Geophysics, Vienna, August 17, 1991.
- Burgess, W. C., and U. S. Inan, Simultaneous perturbation of conjugate ionospheres in association with individual lightning flashes (abstract), *EOS Trans. AGU*, *70*, 1009, 1989.
- Burgess, W. C., and U. S. Inan, Hemispheric distribution and magnetic conjugacy of Trimpi events, paper presented at the Sixth Scientific Assembly of the International Association of Geomagnetism and Aeronomy, Exeter, July 26, 1989.
- Burgess, W. C., and U. S. Inan, Lightning-induced precipitation of MeV electrons from the inner radiation belt (abstract), *EOS Trans. AGU*, *68*, 1222, 1987.