GravWave® LLC TEAM

(A group of individuals in the United States who have a common interest in High-Frequency Gravitational Waves)

Robert M L Baker, Jr., PhD

Principal Investigator and Project Manager

Robert M. L. Baker Jr., was born in Los Angeles on September 1, 1930. He has been married to his wife Bonnie since 1964 and has three grown children. Baker earned a bachelor's degree in Physics at UCLA with highest honors (*summa cum laude* – first in his class) was elected to *Phi Beta Kappa*, earned a master's degree in Physics and a Ph.D. in Engineering at UCLA—the Ph.D. degree with a specialization in aerospace was, according to UCLA officials, the first of its kind to be granted in the United States. Dr. Baker was on the faculty of the Department of Astronomy at UCLA from 1959 to 1963 and the Department of Engineering and Applied Science at UCLA from 1963 to 1971 as a Lecturer and Assistant Professor. During that time he was a Lecturer at the *United States Air Force Academy.* While on a two-year tour of active duty in the Air Force he worked on a variety of classified aerospace projects. He was the head of the Lockheed's *Astrodynamics Research Center* in Bel Air, California and in 1964 joined *Computer Sciences Corporation* as the Associate Manager for Mathematical Analysis. In 1980 he was elected President of *West Coast University*, an accredited university for the adult learner now operating under the auspices of *American Career College* in Los Angeles. After retiring from West Coast University in 1997 as President and Professor of Engineering, Dr. Baker became the Senior Consultant for *Transportation Sciences*

Corporation and *GRAVWAVE© LLC*. He won the UCLA *Physics Prize*, was recipient of the *Dirk Brouwer Award* for outstanding contributions in astrodynamics and orbital mechanics, and was a recipient of the *Outstanding Man of the Year* Junior Chamber of Commerce award in 1965 presented to him by Ronald Reagan. He is a *fellow* of the *American Association for the Advancement of Science.* He was national chairman of the Astrodynamics Technical Committee of the *American Institute of Aeronautics and Astronautics* (AIAA) from 1961 to 1964, was Editor of the *Journal of the Astronautical Sciences* from 1963 to 1975, was appointed by William Bennett to the *National Advisory Committee on Accreditation and Institutional Eligibility* of the Department of Education from 1987 to 1989, was appointed to the *Academic Review Committee on Gravitational Research* with the U. S. Army from 2001 to 2003, Head of Committee on High-Frequency Gravitational Waves of the *Oakland Institute for Gravitational Wave Research* 2002-*,* Vice Chairperson of the first International HFGW Workshop at the MITRE Corporation in 2003, Honorary Chairman of the second International HFGW Workshop in Austin Texas in 2007, Advisory Professor *Chongqing University*, China 2004, and was the author of several textbooks and over one hundred company reports, symposium papers, and journal articles in the area of astrodynamics, celestial mechanics, and High-Frequency Gravitational Waves (HFGWs) including *An Introduction to Astrodynamics* (1960) with Maud W. Makemson and *Astrodynamics: Applications and Advanced Topics* (1969). Dr. Baker has been Project Manager on three prototype development, fabrication, and test projects under contract to the U. S. Navy and Principal Investigator on several NASA and USAF projects while head of Lockheed's *Astrodynamic Research Center*. As President of *West Coast University* Dr. Baker coordinated the activities of six groups of scientists and engineers spread throughout Southern California. Dr. Baker has been interested in the dynamics of gravitational fields since the 1950's and gravitational-wave research since the early 1960's. He holds six patents and 14 pending patents in the United States, Europe, Russia, and China in the area of gravitational-wave generation and detection in the laboratory. You are invited to visit: www.DrRobertBaker.com.

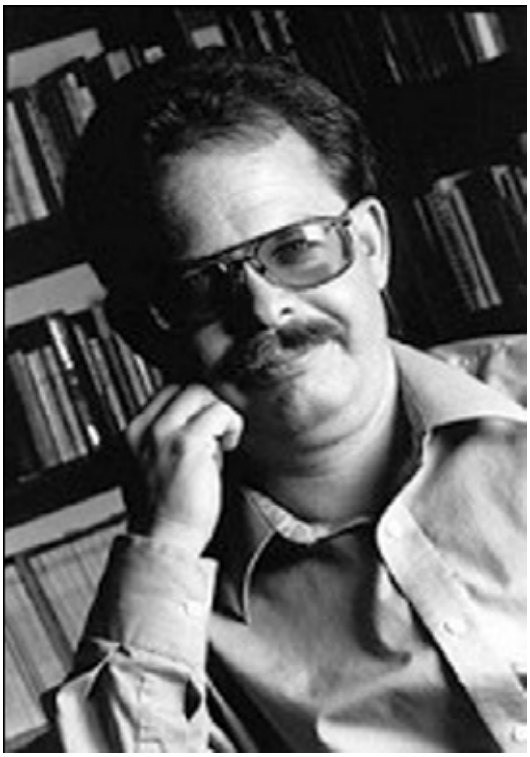
Roger Clive Woods, M.A., D.Phil., D.Sc. (Oxford), FIET

Senior Scientific Investigator

R. Clive Woods was born in Leicester, England on May 18, 1955. Currently he is Department Chairman and Voorhies Distinguished Professor, Department of Electrical and Computer Engineering, *Louisiana State University*. Woods earned a Master's degree and Doctorate at New College, *University of Oxford*, 1976 and 1980, for work on magnetic resonance in rare earth metal alloys in the Solid State Physics group of the Clarendon Laboratory in the *University of Oxford*. Dr. Woods was a Senior Scientist and Project Manager at Plessey Research (Caswell) Ltd. from 1982 to 1983, and Lecturer and Senior Lecturer on the faculty of the Electronic and Electrical Engineering Department of the *University of Sheffield* from 1983 to 2001. During this period he managed projects on the design, development, and test of microwave acoustic devices, III-V heterojunction bipolar transistors, avalanche photodiodes, high-temperature superconductors, and other solid-state devices. In 1989 he was appointed as a *British Association Media Fellow* and in 1995 he was Professeur Invité at the Laboratoire de Physique de la Matière, *Institut National des Science Appliquées* de Lyon, France. From January 2002 to June 2006 Dr. Woods was a Full Professor of Electrical and Computer Engineering at *Iowa State University*, Ames, Iowa. During 1992-1995 he was a Member of IEE Professional Group Committee S8 (Electromagnetics); 1999-2002 a Member of IEE Professional Group Committee E3 (Microelectronics and Superconductor Devices); 1999-2002 an Associate Editor of *IEE Electronics and Communication Journal*, and in 2003 a Member of the *National Science Foundation* SBIR/STTR Photonics (Lasers and LEDs) panel. Dr. Woods has consulted for Barnsley Business and Innovation Centre Ltd., McLarens Ltd., Price Waterhouse, John Lovell Associates, Halpern & Ward

Associates, the European Commission in Brussels, and Ashton Brown Associates Ltd. among others. He has authored over 70 technical papers and the book "Digital logic design" (with B. Holdsworth), Butterworth-Heinemann, 2002. Dr. Woods has been interested in the research associated with gravitational-waves for over a decade and participated in the first International HFGW Workshop at the MITRE Corporation in 2003 and the second International HFGW Workshop at Austin, Texas in 2007.

Eric W. Davis, PhD



Senior Scientific Investigator

Eric Davis received his bachelor's degree in Physics in 1983 and a Ph.D. in Astrophysics with a specialization in the theory of relativity from the *University of Arizona* in 1991. His fields of specialization include relativity theory and cosmology, space mission engineering, gravitational-wave research, and the NASA Breakthrough Propulsion Physics program. Dr. Davis is a Senior Scientist at *The Institute for Advanced Studies at Austin.* He also participates in and serves as a consultant to the NASA Breakthrough Propulsion Physics program. For nearly six years Dr. Davis served as a research scientist and S&TI analyst at the National Inst. for Discovery Science-Bigelow Aerospace Co. where he conducted phenomenology research and forensic investigations into transient optical phenomena and manned spaceflight research projects. Dr. Davis began his graduate work as a mission support and research assistant with the Infrared Astronomical Satellite group at the *Steward Observatory* in

Tucson, AZ. In 1985, he joined the Voyager Ultraviolet Spectrometer Experiment group at the Lunar & Planetary Lab in Tucson where he conducted research on Jupiter's magnetosphere, the Uranus and Neptune planetary encounters, and participated in the Voyager 1 & 2 space mission support. Following completion of his doctorate, he became an associate faculty and interim director for the Arizona Astronomy Education Center at *Pima College* in Tucson. In 1995 Dr. Davis was appointed to the faculty of physical/computer sciences & mathematics, where he was involved with Air Force sponsored space mission engineering and Korean theater space reconnaissance training, at the *University of Maryland* Asian Division while he was stationed at the 8th Fighter Wing in Kunsan, South Korea. Dr. Davis developed experiment designs and cost estimates supporting the AFRL Advanced Concepts Office He has also been recognized by the *American Institute of Aeronautics and Astronautics* in their 1993-94 Public Policy Award for outstanding contributions to national defense and space public policy, and received recognition from the State of Arizona Economic Conversion Council for contributions to commercial conversion of small-medium space and defense businesses in Arizona. Dr. Davis is a Fellow of the *British Interplanetary Society*, senior member of the *American Institute of Aeronautics & Astronautics*, member of the *Association of Former Intelligence Officers*, and member of the *American Astronomical Society.* Dr. Davis participated in the first International HFGW Workshop at the MITRE Corporation in 2003 and the second International HFGW Workshop at Austin, Texas in 2007.

.

Gary V. Stephenson

Scientific Investigator

Gary Stephenson received his B. S. Degree in Physics at Montana State University in 1983 and from 1984 to 2000 performed graduate studies at the University of California, Purdue University and the University of Washington in Physics and Electrical Engineering. From 1983 to 1986 he was a Member of the Technical Staff at Hughes Aircraft Company where as a systems engineer he worked on optical and radar systems. In 1986 Mr. Stephenson joined the Aerospace Optical Division of ITT where he performed research, development, and systems design studies of space borne meteorological Infrared imagers. In 1989 through 1997 he returned to Hughes as a Systems Engineer where he was responsible for the electro-optical systems engineering and on-site support of AST, an airborne infrared tracking sensor for the U. S. Army, and prepared a number of proposals, including technical volumes for early phases of EAGLE (Extended Airborne Global Launch Evaluator), mobile THEL (Tactical High Energy Laser), and NPOESS (National Polar-orbiting Operational Environmental Satellite System). From 1997 to the current date he has been a Systems Engineer at The Boeing Company where he has again been involved in the systems design of electromagnetic and electro-optical mission equipment, including TAPLOC, (TENCAP AWACS Precision Location) and Connexion by Boeing. Stephenson is an expert on the Gertsenshtein effect (utilized for both generation and detection of HFGWs) and has published several papers in that area. Since 1997 he has also been the president and chief investigator for Seculine Consulting. Mr. Stephenson has publications in a variety of applications areas, seven patents, participated in the first International HFGW Workshop at the MITRE Corporation in 2003 and the second International HFGW Workshop at Austin, Texas in 2007, and has publications in the communications applications of high-frequency gravitational waves.

Lawrence S. Moy, M.D.

Medical/Biological Investigator

Lawrence Moy graduated from Medical School at the University of California at Los Angeles in 1981 and was certified by the American Board of Dermatology. For the last several years Dr. Moy has worked with Dr. Baker on the applications and influences of high-frequency gravitational waves on biological matter especially on the muscles underlying the skin. They have jointly published peer-reviewed scientific papers on the subject.

Colby Harper

Telecommunications Specialist

Colby Harper graduated from the *University of Washington* with a BA with College Honors in Economics in 1993 and from 1996 to 1997 performed graduate studies *University of Washington Graduate School of Business Administration.* In 1993 he was the recipient of the Certificate in International Economics from the *University of Washington*. Between 1985 and 1990 Mr. Harper was in contract software development and network design and administration for companies including *Westinghouse Corporation*. He was involved in systems engineering at *Digital Communications Associates* in 1990-1991, was Senior Architect, Project Manager and Network Engineer at *Energy Northwest* from 1991 to 1995 and in late 1995 he served in the National Telecommunications and Information (NTIA) branch of the United States Department of Commerce and was a contributor to the Telecommunications Act of 1996. From 1996 to 2001 Harper was the National Director, Wireless Internet Service Provider & Technical Infrastructure at *Inteliant Corporation*, and in 2002 he joined *Washington Mutual* as a Product Manager involving, among other tasks, network systems and information handling. Harper is an IBM-Certified Client/Server Integration Specialist. In summary Mr. Harper is a hands-on wireless telecommunications executive having in-depth technology, operations, and process–improvement experience. In cooperation with Paul Murad he prepared a future concepts paper entitled: “Cost-based Global Optimization of Tomorrow’s High-Frequency Gravitational Wave (HFGW) Communications System: Value-added HFGW Device Requirements for Today,” and coauthored with Gary Stevenson a paper presented at the Space Technology and Applications International Forum (STAIF2007), sponsored by the American Institute of Physics, entitled “The Value Estimation of an HFGW Frequency Time Standard for Telecommunications Network Optimization.”

Buzz Aldrin, Sci. Dr.

Senior Scientific Advisor

Buzz Aldrin was educated at *West Point*, graduating with honors in 1951, and was third in his class. He earned a Doctorate in Astronautics from the *Massachusetts Institute of Technology* in Manned Space Rendezvous. On July 20, 1969, Buzz and Neil Armstrong made their historic Apollo XI moon walk, thus becoming the first two humans to set foot on another world. Since retiring from *NASA*, the *Air Force*, and his position as Commander of the Test Pilot School at Edwards Air Force Base, Dr. Aldrin has remained at the forefront of efforts to ensure a continued leading role for America in manned space exploration. He has been interested in High-Frequency Gravitational Waves since 1999 when he was briefed on the subject by Dr. Baker. Dr. Aldrin heads *Starcraft Boosters, Inc.,* Starcraft *Enterprises* and the *ShareSpace Foundation,* and is Chairman of the *National Space Society.* You are invited to visit: www.buzzaldrin.com.

Robin Fell

International Business Specialist

Robin Fell received her Bachelor of Arts degree in Political Science at the *University of California at Berkley* in 1990, Certificate at the *American University in Paris* in 1989, and a MBA in International Business at *Loyola Marymount University*, Los Angeles in 1997. She was the Night Reporter at television station *KMIR* in Palm Springs, California in 1990., directed domestic video distribution at *Vidmark Pictures* 1992-1994, and Director of International Sales at *Rysher Entertainmen*t 1994-1998. She has made numerous sales trips to Europe and Southeast Asia.

Thomas R. Lane

Scientific Advisor

Thomas R. Lane received his BS *cum laude* in Physics at the *United States Air Force Academy* in 1988. He completed Squadron Officer School in 1994 and graduated from Air Command and Staff College in 2002. From 2000 to 2004 he was Assistant Director of Operations and from 2004 to date he is Chief of Plans at the 28th Bomb Squadron in the *United States Air Force*. Lane is a B-1/T-37 Instructor Pilot and holds a Top Secret security clearance. In 2004 he assisted Dr. Baker in the preparation of the "Layperson's Description of High-Frequency Gravitational Waves (HFGWs)" and has been an active, although unofficial, contributor to HFGW research since that time. He and his wife Cathy live in Abilene, Texas.

Frederick W. Noble

Prototype Analyst

The co-inventor with Dr. Baker of the parent patented HFGW invention, Frederick W. Noble, was born in Oak Park, Illinois, May 1, 1939. He earned a bachelor's degree at *UCLA* with a major in English and a minor in Naval Science. In the *United States Navy* from 1961 to 1963 he served as a junior officer on a destroyer based in Japan. In 1966 he earned a Doctor of Law degree from the *UCLA School of Law* and is a Member of the California and Federal Bar. Mr. Noble was a practicing attorney from 1966 to 1978. From 1979 to the present he is President and CEO of Frederick W. Noble, Inc., a

personal investment company. From 1982 to the present he is President and CEO of *Wintec Energy*, Inc. and its affiliates, which operate wind farms in Palm Springs, California and in the Altamont Pass area in Northern California. In July of 2001 he co-founded GRAVWAVE® LLC with Dr. Baker. Mr. Noble's *Wintec* corporation owns a one-thousand-acre property in Palm Springs, California, with some 600 wind turbines. The property has available several 10-acre to 40-acre flat, vacant sites for the construction of the prototype embodiments of the HFGW generator/detector in the US. Mr. Noble and *Wintec* can make available several civil and electrical engineers and construction personnel for HFGW prototype fabrication and test.

Christine Black

Student Apprentice

Christina Black is an undergraduate student (2008) at *The University of Michigan ,* majoring in Physics and Astronomy and has had courses in EM Theory, Quantum Mechanics, Celestial Mechanics, optics, special relativity and astronomical techniques with a GPA of 3.0. She has a keen interest in HFGW research.

Jeff Schuss

Student Apprentice

Jeff Schuss is an undergraduate (2007) at *Loyola Marymount University*, with a hybrid major of Engineering Physics (EE/Physics). Besides having “gone theextra mile” in investigating many principles and theories that would have been otherwise briefly mentioned in a class, Mr. Schuss plans on taking classes in **pending**. He is fascinated by the work being done with HFGW and looks forward to broadening his horizon’s. He is also the grandson of Dr. Buzz Aldrin.

IN MEMORIUM

One of the most important and intelligent members of the GRAVWAVE® Team has passed away. Bob Anderson was a Captain of Industry, perceived to be assertive, even gruff on the outside, but gentle, kind and generous on the inside – we will miss his business acumen and advice.

Robert Anderson
Senior Management Advisor

Robert Anderson was the Chairman of the Board, President, and CEO of *Rockwell*. He received his bachelor’s degree in mechanical engineering from *Colorado State* University in 1943. He was a knowledgeable and aggressive business man who was an expert in defense and commercial applications of new technology. He has been referred to as “... the father of the B-1 Bomber.” In fact, in 1977 he accepted the prestigious *Robert J. Collier* Trophy for Rockwell International’s work on the B-1 bomber. Mr. Anderson was a Lifetime Trustee of the *California Institute of Technology* and was a Consulting member of the Caltech Board of Trustees Committee on the *Jet Propulsion Laboratory.*

INTERNATIONAL CORRESPONDING SCIENTIFIC ADVISORS

Giorgio Fontana, PhD

Senior Scientific Advisor, Italy

Giorgio Fontana was born in Trento, Italy on June 11, 1957. He received his doctorate with a specialization in electronics at the *University of Padua* in Italy. In 1984 Dr. Fontana became the Head of the Electronics Laboratory of the Department of Physics of the *University of Trento*. In 1995 he became the head of the computer center of the Faculty of Science (physics and mathematics) of the *University of Trento* and in 2000 he was advanced to the Head of the Electronics Laboratory of the Department of Information and Communication Technology at the *University of Trento*. Dr. Fontana has developed scientific instrumentation in the field of laser measurement and characterization of materials, ion transport and analysis, superconductors and related devices, cryogenic semiconductor electronics, optics, gravitational-wave Weber bar detectors and computer systems. Recently he has been involved in the development of technologies for atomic time transfer and synchronization, high speed data switching and fiber optic amplifiers and sensors. Dr. Fontana is interested in the development of new technologies for space travel with gravitational waves and is involved in the development of a suitable theoretical/engineering model for FTL travel through the Hyperspace. Currently he instructs in computer simulation and electronic circuit courses at the *University of Trento.* Dr. Fontana is a member of the *Istituto Nazionale di Fisica Nucleare (INFN).* He has authored well over a dozen scientific papers related to High-Frequency Gravitational Waves (HFGW) in internationally recognized technical journals. He participated in the first International HFGW Workshop at the MITRE Corporation in 2003 and the second International HFGW Workshop at Austin, Texas in 2007.

Gloria Garcia-Cuadrado

Scientific Advisor, Spain

Gloria Garcia-Cuadrado was born in Barcelona, Spain on January 14, 1974. She received a Master in Theoretical Physics (Research Proficiency) by the Physics Faculty of the University of Barcelona, SPAIN;in 2002 she was awarded a Diploma in Space Studies by the International Space University; Polytechnical University of Pomona; California; USA and in 2000 received a Bachelor in Physics by the University of Barcelona; SPAIN. At Aerospace Research & Technology Centre (CTAE) in Barcelona she is the General Manager of the R & D Area of Human Spaceflight and Advanced Concepts including: Strategic planning; Opening of new business and projects; contract negotiation; teaming-up; fundraising; promotion and networking; and Project Managing. The Area focuses also in identifying advanced concepts and technologies to pursue. Projects carried out so far include Space Tourism; Life Support Systems for Human Spaceflight and Gravitational Wave research. As Head of Communication main responsibilities include: representation of the Centre; science outreach; institutional and governmental relations; and media relations and networking. She received a grant by the European Space Agency (ESA) to design, implement and conduct an experiment in microgravity conditions on board an Airbus 300; and a joint grant from ESA and the Government of Catalonia - Generalitat de Catalunya - to attend the International Space University Course, ending in the attainment of the Diploma in Space Studies; California – USA. Ms. Garcia-Cuadrado has expressed a great interest in High-Frequency Gravitational Wave research and she has been previously involved with low frequency Gravitational Wave projects such as LISA and LISA Pathfinder.

Richard Ingley, PhD

Scientific Advisor, England

Richard Ingley received his Ph D in 2005 at Birmingham University, Birmingham, England. His thesis was entitled: “Implementation and Cross Correlation of Two High Frequency Gravitational Wave Detectors” and reports on his fabrication of the first High-Frequency Gravitational Wave (HFGW) detector. The detector was based upon the concept of Mike Cruise who found that in the presence of a gravitational wave, an electromagnetic wave will experience changes in its amplitude, frequency, direction of propagation and polarization. If an electromagnetic wave is confined to move in a circular path in the presence of a gravitational wave, then a resonant condition exists where the *polarization shift* is cumulative with successive passes of the path circumference and thus the HFGW can be detected. Dr. Ingley has published several peer-reviewed papers concerning HFGWs, presented papers at the Amaldi Conferences and was an invitee to the first International HFGW Workshop at the MITRE Corporation in 2003 and the second International HFGW Workshop at Austin, Texas in 2007. He is now associated with the Centre for Electronic Imaging School of Engineering and Design, Brunel University, Uxbridge Middlesex, England.

Fangyu Li, PhD

Senior Scientific Advisor, China

Fangyu Li was born on October 28, 1943. He was a student in the department of Physics at Northwestern Normal University, China from 1961 to 1965. From 1978 to 1990 he was a Lecturer. Associate Professor in the Department of Physics at *Chongqing University,* China and from 1990 to 1991 he was a visiting Scientist at the Gravitational Laboratory of the Sternberg State Astronomical Institute of the Moscow University in Russia. He was an Associate Professor, Department of Physics, *Chongqing University* from 1991 to 1994, was appointed Head of the Physics Department of *Chongqing University* from 1996 to 1998, and was appointed Dean of the college of Science at *Chongqing University* during the period 1998 to 2000. From 1994 to date, he has been a professor of Physics and Doctorate Tutor at the University. Now he is a member of the Council of the Chinese Physics Society, a member of the Council of the Chinese Gravitational and Relativity Astrophysical Society, a member of the World Laboratory, Chairman of *Chongqing Physics Society*, China and Head of the *Gravitational Physics Institute of Chongqing University*. His research fields include General Relativity and gravitation, classical and quantum electrodynamics in curved spacetime, theories of gravitational waves and gravitational radiation, positive definite problems of energy-momentum tensor of gravitational field, exact and approximate wave solutions of the Einstein field equations, gravitational perturbation effect in topological phonon space, interaction of gravitational waves with electromagnetic fields, and detection of high-frequency gravitational waves. Dr. Li has published more than sixty papers concerning gravitational waves in internationally recognized scientific journals and authored a paper at the first International HFGW Conference and Workshop at The MITRE Corporation in 2003 participated in the second International HFGW Workshop at Austin, Texas in 2007.