Timothy R. Ginn **Curriculum Vitae**

Civil and Environmental Engineering, 3141/1011 EU III
University of California, Davis CA 95616
website: http://cee.engr.ucdavis.edu/faculty/ginn/

email. trginn@ucdavis.edu
ph. 530 219-1282
fax 530 752-7872

Education:

Ph.D.	Civil Engineering (Hydrogeology)	1988 Purdue University
MS	Civil Engineering (Water Resources)	1985 Purdue University
BA	Classics, Environmental Sciences	1982 University of Virginia

Professional Experience

2001-present	Professor of Civil & Environmental Engineering, UC Davis
1999-2001	Associate Professor of Civil & Environmental Engineering, UC Davis
1997-1999	Acting Associate Professor of Civil & Environ. Engineering, UC Davis
1994-1997	Senior Research Scientist, Battelle Pacific Northwest National Lab
1991-1994	Research Scientist, Battelle Pacific Northwest National Lab
1989-1991	Alexander Hollaender Distinguished Postdoctoral Fellow, Battelle PNNL
1988-1989	Visiting Assistant Professor, Civil Engineering, Purdue University

Teaching: 12 classes at UC Davis, 8 developed, 7 currently offered, very good-excellent evaluations. 36 graduated master's students, 10 graduated doctoral students, 10 postdoctoral advisees. Of my postodocs and doctoral students, 7 are now faculty. Established record in recruiting and graduating underrepresented groups.

Research: *Current focal points*; Exposure time and hydrologic age; Colloid filtration theory and microbial transport; Ureolytic calcite precipitation in granular media; Reactive transport in natural porous media; Inverse problems in hydrology; Horizontal gene transfer; Alternative fuels environmental risk assessment.

Service: Extensive reviewing, editing, session convening, and consulting for state and federal agencies; private consulting; UC, College, and Departmental committee service.

Table of Contents **Page**

Teaching	**2**
Graduate and Undergraduate student research assistants	3
Postdoctoral associates	4
Research accomplishments	**5**
Research grants	**7**
Publications: Journal papers and book chapters	9
Reports	17
Professional Service, Editing, and Affiliations	**20**
Agency & Private Consulting	**25**
Invited/Plenary lectures	**25**

Teaching

I have taught undergraduate and graduate classes in hydrological inverse problems, hydrogeology, biogeochemical reactive transport, environmental water quality, probability/ statistics, computational fluid mechanics, and population dynamics. My evaluations in all of my classes are very good – excellent and above departmental averages.

- ***Pollution and Population Dynamics*** (FRS 003). Concepts in quantitative population dynamics: project class focuses on linking vulnerable populations with significant biological, chemical, or thermal "contaminants"
- ***Probability and Statistics for Engineering Systems Analysis*** (ECI 114). Basic probability and statistics for upper-division engineering undergraduates
- ***Groundwater Systems Design*** (ECI 144). Introductory hydrogeology and groundwater hydraulics; well systems; groundwater quality and contamination, introduction to groundwater modeling.
- ***Water Quality Management*** (ECI 148A). Concepts of water quality, aqueous inorganic chemistry, water and wastewater treatment processes, and water quality management.
- ***Advanced Hydrogeology: Flow*** (ECI 272A). Continuum mechanics of subsurface flow processes; geologic properties, flow in confined and unconfined aquifers, radial flow and well hydraulics; heterogeneity and introductory stochastic hydrogeology; isotopes and isotopic hydrogeology.
- ***Advanced Hydrogeology: Transport*** (ECI 272B). Continuum mixture mechanics of subsurface transport processes; transport equations and analytical solutions; Nonlocal transport theories and continuous-time random walks; numerical approaches including finite volume and finite difference solution strategies for flow and transport in aquifers; use of public domain codes for groundwater transport modeling.
- ***Advanced Hydrogeology: Reactive Transport*** (ECI 272C). Multicomponent reactive transport modeling involving both kinetically-controlled reactions and reactions at equilibria, in multiphase systems; formulation of reaction networks for remediation of groundwater contaminants (metals, organics) by chemical or microbiological means, with three-dimensional advective-dispersive-diffusive transport; application of public domain code (PHREEQCII) in solving reactive transport problems in one-dimension.
- ***Finite Elements and Volumes: Applications to Fluid Problems*** (ECI 212C) Application of the finite element and finite volume approaches to multidimensional fluid flow problems, including viscous incompressible flow, advective-diffusive transport, and the shallow water equations.
- ***Metals in Hydrology*** (ECI 289A) Survey of dissolved and colloidal metal contamination of environmental water; thermodynamics of aqueous speciation, sorption, and surface complexation reactions; modeling inorganic equilibrium reaction systems, remediation.
- ***Groundwater Modeling with GWVistas*** (ECI 289A) Basic introduction to three-dimensional modeling of groundwater flow and transport using Groundwater Vistas program.
- ***Inverse Problems*** (ECI 271, begun in 2007). Introduction to inverse problems; mappings nomenclature, integral equation forms, linear algebraic forms, optimization forms. Optimization solution methods including zero-, first-, and second-order; use of UCODE public domain code for first-order (gradient-based) optimization, in context of hydrogeological and other fields.

Graduate and Undergraduate student research assistants

I regularly involve undergraduates in research as part of my teaching. This is formalized through either credit-conferring special class set-up or by hiring the student as undergraduate research assistant, or both. This is how my research mentoring began with several of my eventual graduate students, including Tammer Barkouki (2007), Vanessa Nino (2009), and Andrew Benjamin (2012) who I recruited after he completed his football scholarship at UCDavis, and others including KC Curthoys (2006) and Diego de la Torre (2013) who went to engineering practice after obtaining their undergraduate degrees. My current group includes 10 undergraduate assistants, included in the listing below.

The **current group** (9/2014) includes 3 doctoral, 1 master's, and 10 undergrad researchers.

Student	Degree, topic
Mohamed Nassar	Civil Eng. PHD, Inverse problems, mixing and reactive transport
Ahmed Ali	Civil Eng. PHD, Mixing-limited biodegradation in situ
Mehrdad Bastani	Civil Eng. PHD, Ureolytic calcite precipitation
Andrew Benjamin	Civil Eng. MSCE, Colloid-surface interaction forces
Arjun Nataranjan	Biochemistry BS, Horizontal gene transfer in the environment
Daniel Nguyen	Physics BS, Horizontal gene transfer in the environment
Areeba Syed	Civil Eng., BSCE, Mixing and reactions in nonuniform flows
Arturo Palomino	Civil Eng., BSCE, Fixing the Derjaguin approximation
Maddi Rasmus	Civil Eng., BSCE, Geothermal energy production.
Titus Garritt	Civil Eng., BSCE, Upscaling reactive transport in groundwater
Cassandra Kuang	Civil Eng., BSCE, Colloid filtration theory
Elena Thompson	Civil Eng., BSCE, Groundwater renewability
Austin Lemire	Civil Eng., BSCE, Groundwater renewability
Amy Naumovski	Civil Eng., BSCE, Groundwater renewability

My **graduate group** members have earned 36 masters degrees and 10 doctoral degrees since I joined UC Davis in 1997. The masters' degrees span a range of topics as follows.

Student	Degree, year, topic	Currently
Tracy Heidersbach	MSCE, 2014 Risk assessment of natural gasoline	West Yost & Assoc.
Chris Morrow	MSCE, 2014 Owens Lake Ancient Irrigation	USC doctoral
Patrick Sutton	MSCE, 2013 Solar-powered insitu remediation	Baseline Consulting
Nooshin Salki	MSCE, 2012 Waste injection wells in California	Chevron
Mei-Lun Lui	MSCE, 2012 Biodiesel cosolvency	CA DWR
Shima Motlagh	MSCE, 2012 Ethanol-gasoline cosolvency	Mother
Sailin Xia	MS (Hydrology), 2012 Ethanol-gasoline fate	Beijing Univ.
Vanessa Nino	MSCE, 2012 Ancient irrigation puquios in Peru	US COE
Philip L'Amoreaux	MSCE, 2012 Stream cobble size distributions	Ludorff&Scalomini
Tyler Hatch	MSCE, 2011 Biodiesel fate and transport	CH2MHill
Eric Geissinger	MSCE, 2011 Colloid filtration theory	Aspect Consulting
Peter Hoseit	MSCE, 2011 Analytical solution solute transport	Dudek Engineering
Mehran Ebrahimi	MSCE, 2011 Acid mine drainage	GSI, Inc.
Jon Kaminsky	MSCE, 2010 River bank filtration modeling	Ludorff&Scalomini
Tess Weathers	MSCE, 2010 In situ uranium reduction	CO School of Mines
Tomer Schetrit	MSCE, 2010 Ethanol-gasoline fate and transport	Terraphase Eng.

Bow Issankarun	MSCE, 2010 Uranium reoxidation in situ	CA Water Board
Tammer Barkouki	MSCE, 2009 Ureolytic calcite precipitation	USAF Pararescue
Dan Patten	MSCE, 2009 Geologic characterization	Marin Co. Water
Matt Diaz	MSCE, 2008 Stormwater metals contamination	Chevron
Karen Duff	MSCE, 2008 Stormwater BMPs	Michigan DWR
Tony Knapp	MSCE, 2008 Sanitation in Tijera, Panama	MWH
Hanieh Haeri	MSCE, 2007 Striped bass population dynamics	Hydrologics Inc.
Ann Mathew	MSCE, 2007 Parameter estimation	Mother
Kristi Ross	MSCE, 2006 Biodiesel environmental risk	US COE
Matias Perle	MS (Hydrology) 2006 Groundwater age	RestoreDeschutes
Rhodora Biagtan	MSCE, 2006 Water resources systems analysis	Dublin Water
Sevinc S Sengör	MSCE, 2005 Metals fate in benthic sediments	SMU Faculty
Eileen Belding	MSCE, 2005 Uranium reoxidation in situ	NCSU
Lynette Shipsey	MSCE, 2005 Metals in groundwater	Mother
Limor Geisler	MSCE, 2005 River morphology	Watercourse Eng.
Esther Chung	MSCE, 2003 Ethanol materials compatibility	CA Water Board
Mak Shatila	MSCE, 2003 Groundwater modeling Tooele, UT	US COE
Michael Wademan	MSCE, 2001 Bacteria transport in groundwater	Nolte Engineering
Bryton Johnson	MSCE, 2000 Groundwater flow modeling	US Army
Chris Brugato	MSCE, 2000 Anaerobic biodegradation kinetics	Westec Engineering

My PhD students have taken 10 degrees leading to four faculty positions held (shown in **bold**).

Student	Degree, year, topic	Currently
Nic Engdahl	PHD (Hydrology), 2012 (co-advised) Gw age	**WSU CEE**
Tyler Hatch	PHD, 2013 Multimedia risk assessment	CH2MHill
Hanieh Haeri	PHD, 2009 Modeling groundwater age	Hydrogeologics
Linda Woolfenden	PHD, 2008 Modeling groundwater age	USGS
Sevinc S Sengör	PHD, 2007 Metals fate in benthic sediments	**SMU CEE**
Arash Massoudieh	PHD, 2006 Colloid-facilitated metals transport	**CUA CEE**
Kirk Nelson	PHD, 2006 Colloid filtration theory	US BR
Rochelle Shang	PHD, 2002 Streamtube sets for groundwater	Self-employed
Uma Seeboonruang	PHD, 2002 Modeling groundwater exposure	**KMU CEE**
Chris Green	PHD (Hydrology), 2002 (co-advised) Gw flow	USGS

Postdoctoral Advisees

I have advised or co-advised 10 postdoctoral associates, four of whom have taken faculty positions (three of whom were not my doctoral students) shown in **bold**.

Postdoc	Topic	Current Position
Tyler Hatch	Multimedia risk assessment	CH2MHill.
Tamir Kamai	2013-14, Colloid filtration theory	Agricultural Res. Office, Israel
Kirk Nelson	2010-12 Colloid filtration theory	US Bureau of Reclamation
Laura Foglia.	2010-12 Groundwater modeling	**Tech. Univ. Darmstadt Institute of Applied Geosciences**
Sevinc Sengör	2008-09 Reactive transport	**SMU Civil & Env. Engineering**
Arash Massoudieh	2007-08 Benthic cycling of metals	**CUA Civil & Env. Engineering**
Petros Gikas	2009-12 Environ. microbiology	**Tech Univ Crete, Env. Engineering**

Irina Tikhonova	2006, Fish population dynamics	U. Cambridge
Mahbubur Rahman	2005, Population dynamics	**Univ. N. FL Math & Statistics**
Hakan Başağaoğlu,	2003, Multidomain diffusion	SwRI, San Antonio TX

Research Accomplishments

Here I summarize my past research accomplishments, with reference to publications cited below starting at page 9. Because my research portfolio is diverse, I provide a listing of publications by topic also, at http://faculty.engineering.ucdavis.edu/ginn/publications/by-topic/. I also provide separate website pages summarizing my currently active research topics at http://faculty.engineering.ucdavis.edu/ginn/projects/ (drift the mouse over Projects for a dropdown menu of my project pages).

Metrics: I have produced ~115 papers garnering over 4200 citations with a resulting h-index of 28 (Google scholar 12/14), reflecting successful project leadership and grantsmanship with 15 federally-funded projects active or completed, and 5 current grants totaling ~ $1.6M. Presentations include over 150 abstracts, over 100 presentations delivered, 33 of which are invited/plenary. In recognition of such things I won the 2010 UC Davis College of Engineering Outstanding Engineering Mid-Career Award.

Generalized Exposure-time in Biogeochemical Cycling, Population Dynamics, Disinfection, and Other Things: I invented the use of another dimension (in addition to space and time) in accounting for the exposure of one mixture component to another (Ginn, 1999; 2000a, b). This work has been genuinely seminal in that it has led to advancements in modeling bacterial toxic response to heavy metals (Sengör et al., 2009; Gikas et al., 2009; Sani et al., 2010; Sengör et al., 2012;), population dynamics with dose accounting (Ginn et al., 2004; 2007; Ginn and Loge, 2007;) applied to fish (Collier et al., 2006; Loboschefsky et al., 2012), disinfection of particle-associated pathogenic bacteria (Dietrich et al., 2007; Camarillo et al., 2011), and exposure of humans to etiological agents in recreational water (Loge et al., 2009), among others, including groundwater age, described below.

Theory and upscaling of reactive transport: I am one of the primary developers (along with Cvetkovic, Valocchi, Cirpka, Blunt, and others) of the "streamtube ensemble" (aka stochastic-convective) upscaling technique for quantifying reactive transport in nonuniform flows (Ginn et al., 1995; Simmons et al., 1995; Ginn, 2001; 2002; Ginn et al., 2001; Seeboonruang and Ginn 2006a,b). I have just this year made a breakthrough with international collaborators T. Le Borgne and M. Dentz on improving this approach by quantifying so-called "lateral mixing" by accounting for the impact of adjacent streamtube kinematics on mixing-limited reactions (Le Borgne et al., 2014). This result was central to my most recent NSF project award, "A Practical Upscaling of Reactive Transport", awarded October, 2014.

Metals in aquatic ecosystems: This past decade, I have continually been involved in large scale collaborative studies of heavy metals in surface waters, benthic sediments, and groundwaters, originally in collaboration with B. Peyton (Montana State U) and N. Spycher (LBL). These studies are highly interdisciplinary and my role is usually modeling the interaction between environmental fluid dynamics and biogeochemical cycling processes associated with metals fate, in a rigorous context of multiple bacterial guilds and as complete an understanding of mineralogy as possible (Sengör et al, 2007; Massoudieh et

al., 2008; Moberly et al., 2009; Rastogi et al., 2009; Massoudieh and Ginn, 2010; Massoudieh et al., 2010a, b; Spycher et al., 2011; Singh et al., 2014).

Hydrologic Age: I discovered the governing equation for groundwater age via my exposure-time accounting methodology in Ginn (1999), and introduced this concept practically in groundwater modeling in Ginn et al. (2009) and in Woolfenden and Ginn (2009). This topic has recently attracted a great amount of attention because of the power of groundwater (and more generally, hydrological) residence time distributions (same as age) in understanding hydrological sustainability, and impacts of climate change (Massoudieh and Ginn, 2011; Engdahl et al., 2012; 2013; McCallum et al., 2014). I am currently collaborating with Prof. Jean-Raynald de Dreuzy of Geoscieces Rennes in France on characterizing hydrological and geological flow systems with residence time distributions, and with J. McCallum and P. Cook (CSIRO, Australia) on transient residence time distributions, and on applications to the highly nonlinear watershed flow problems.

Microbial-Induced Calcite Precipitation: Ureolytic bacteria naturally convert urea to ammonia via hydrolysis reaction that raises pH, and the associated increase in alkalinity can cause precipitation of calcite in solutions where calcite is near saturation. I began working on modeling of this process in the context of in-situ groundwater remediation of divalent metals / radionuclides with R. Smith (U. Idaho) and Y. Fujita and G. Redden (INL). From this basis I translated the modeling to the geotechnical engineering challenge of strengthening unconsolidated granular media in collaboration with experimentalist J. DeJong and microbiologist D. Nelson (UC Davis). We have successfully designed, tested, and implemented efficient treatments of granular porous media at low cost in order to achieve very significant increases in shear wave velocities in the resulting consolidated (by calcite precipitation) porous media. This is reported in a series of papers describing incrementally larger scale experiments with modeling in Barkouki et al. (2011), Martinez et al. (2011), DeJong et al. (2011, 2014), and Martinez et al. (2013; 2014). DeJong and I are currently co-PIs of two NSF grants on this very active research area and we are currently finalists for an NSF Center Grant (24M$ for 5 years) collaborating with ASU, NMSU, and Georgia Tech on the same.

Inverse Problems: My first research accomplishment was developing inverse modeling approaches for groundwater systems using transient data, that was the first instance of what became known as "hydraulic tomography"(Ginn and Cushman, 1992; Ginn et al., 1990). More recently I have incorporated groundwater age in characterization of subsurface flow properties via inverse methods (Ginn et al., 2009; Nassar and Ginn, 2014b), and the impact of numerical errors on subsurface characterization by inverse modeling when density effects impact the groundwater flow (Nassar and Ginn, 2014a).

Colloid Filtration Theory and Microbial Transport in Porous Media: I have a long history of research in bacterial transport in porous media (Deflaun et al, 1997; Murphy and Ginn, 2000; Ginn et al., 2002; 2006), that I eventually focused onto rigorous pore-scale modeling of bacteria (as colloids) transport in porous media in efforts to develop improvements to the classical colloid filtration theory (CFT) that underlies many areas of environmental engineering including pathogen transport, filter design, and colloid facilitated transport (Nelson et al., 2007; Nelson and Ginn, 2001; 2005; 2009; 2011). I am currently funded on an NSF grant in this area and am working with collaborators to continue improving the understanding of colloid behavior in porous media (Massoudieh et al., 2013; Kamai et al., in preparation). I am recognized as a leader in this area as I seem to have become the go-to person for invited talks on the topic, giving my fourth one in 2 years at the upcoming Fall 2014 meeting of the American Geophysical Union in San Francisco.

Horizontal gene transfer kinetics: Together with collaborators F. Loge (UCDavis) and H. Nguyen (UIUC) I have helped pioneer the quantitation of rates of, and primary controls on, the horizontal (as opposed to generational/vertical) transfer of genes among bacteria in the environment. This important yet difficult problem has received funding from two separate NSF project and has led to several important publications with my students and those of my collaborators. (Massoudieh et al,, 2007; 2010; Lu et al., in review).

Nonlocal transport: Dispersive processes of solutes in environmental flow fields are classically treated as local, that is, the dispersive flux of a solute is supposed to be proportional to the (local) gradient of solute concentration. I am among the pioneers of the mathematical generalization of this concept to so-called "nonlocal" dispersive transport (Cushman and Ginn, 1993a,b; 2000). This highly contentious topic has seen immense activity over the intervening score of years, and I have continued contributions. First, in 2009, I showed that a simple linear reversible sorption process, when fitted with memory of time sorbed (using my exposure-time trick, described above) gave the same nonlocal behavior as that captured by actively promulgated theories (Continuous time random walks, and Multirate mass transfer; in Ginn, 2009). More recently I have explored the impact of nonlocal transport on groundwater age (Engdahl et al., 2012), and I have shown that some important experimental results previously claimed to show that all transport is nonlocal, can actually be explained as local, by careful, rigorous modeling (Ginn et al., 2013).

Multimedia Risk Assessment for Alternative Fuels: My coPI's (T. McKone, UC Berkeley, and D. Rice, retired from LLNL) and I have established the process of Multimedia Risk Assessment for new and alternative fuels in California. This work has has impacted California state regulatory policy for new fuels including Biodiesel, Renewable Diesel, and Dimethyl Ether. Our risk assessment serves as a paradigm for other problems involving green chemistry and green engineering, and complements life-cycle analyses and economic assessment of alternative energy sources. My contributions in this regard appear as Technical Reports 34-40 on page 20 below.

Research Grants. Current Funding $1.6M.

NSF/EAR Hydrologic Sciences A Practical Upscaling of Reactive Transport. PI. $566,000, 2014-2017.

NSF/CMMI Bio-Cementation Field-Scale Trials: Addressing the Challenges of Treatment Unformity & Verification, Biostimulation, & By-Product Management, (co-PI with Jason DeJong/UCDavis), $596,646, 2012-2015

NSF/EAR Hydrologic Sciences Near-Surface Repulsion and Mixing-Limitations: Upscaling of Colloid Transport in Non-Uniform Media under Unfavorable Conditions (co-PI with William Johnson/Utah State and Markus Hilpert/JHU), $159,917, 2012-2015.

NSF/EAR Hydrologic Sciences Collaborative Research: Experiments and Modeling in Horizontal Gene Transer (co-PI with Helen Nguyen/UIUC and A. Massoudieh/CUA), $129,000, 2011-2013.

CA Air Resources Board Multimedia Risk Assessment for Alternative Fuels (co-PI with Thomas McKone/UCB), $485,000 2008-2014; $135,000 2014-2015.

UC Office of International Programs Educational use of environmental tracers in the calibration of aquifer models and management of groundwater (co-PI with J.-R. de Dreuzy, Universite' Rennes, France), $18,000, 2013-2014.

Previously Funded Research Projects

CA DWR – Interagency Ecological Program, Pelagic Organism Decline Subprogram (IEP/POD). The Role of Contaminants, within the Context of Multiple Stressors, in the Collapse of the Striped Bass Population in the San Francisco Estuary and its Watershed $800,000, 2007-2011. (co-PI with F. Loge/UCD PI).

NSF/Collaboration in Mathematics and Geosciences (CMG). Toward Understanding the Transfer of Genetic Information in the Subsurface", $360,000, 2006-2010. (co-PI with F. Loge/UCD, and J. Cushman/Purdue).

DOE/Environmental Management Science Program (EMSP). (co-PI with R. Smith, Y. Fujita, G. Redden, N. Spycher) Field Investigations of Microbially Facilitated Calcite Precipitation for Immobilization of Sr-90 and Other Trace Metals in the Subsurface, $650,000, 2007-2009.

DOE/Environmental Management Science Program (EMSP). (co-PI with B. Peyton, R. Sani, N. Spycher) Subsurface Uranium Fate and Transport: Integrated Experiments and Modeling of Coupled Biogeochemical Mechanisms of Nanocrystaline Uraninite Oxidation by Fe(III)-(hydr)oxides, $800,000, 2007-2009.

NSF/Chemical, Bioengineering, Environmental, and Transport Systems (CBET) (co-PI with Brent Peyton, WSU (now Montana State)), Collaborative Research: Biogeochemical cycling of heavy metals in Lake Coeur d'Alene sediments: The role of indigenous microbial communities, $440,000 (subcontract to WSU), 2004-2008.

CALTRANS (PI), Infiltration Basin Study: Modeling Roadway-source Reactive Contaminant Transport in the Vadose Zone", $278,000, 2004-2006.

CA EPA (PI), Alternate Fuel Peer Review: Guidelines for Assessing Environmental Risk, $448,500, 2004-2007;

US NSF/ Chemical, Bioengineering, Environmental, and Transport Systems (CBET): Penetration of Chemical Disinfectants into Particles Developed in Water Treatment: Role of Radial Diffusion on Disinfection by UV and by solutes (co-PI F. J. Loge), 2001-2003.

CA State Water Control Board: Review of Compatibility and Permeability of Underground Storage Tank Materials to Ethanol-Blended Automotive Fuels, 2000-2001.

CA Water Resources Center: Application of a New Model for Groundwater Age Distributions: Modeling and Isotopic Analysis of Artificial Recharge in the Rialto-Colton Basin, California (co-PI L. Woolfenden, USGS), 2000-2002.

DOE/Natural and Accelerated Bioremediation Research (NABIR): Data Analysis/Integration for Comparative Oxic/Anoxic Field Injections of Tracers and Native Bacteria at the Oyster, VA Field Site (co-PI T. D. Scheibe, PNNL),1998-2002.

DOE/Natural and Accelerated Bioremediation Research (NABIR): The Influence of Heterogeneity and Growth on Microbial Transport in Saturated Porous Media (co-PIs E.M. Murphy and F. Brockman, PNNL), 1998-2000.

DOE/Environmental Management Science Program (EMSP): Dynamics of Coupled Microbial and Contaminant Transport in an Anaerobic Consortium including *Desulfomonile tiedjeii* (co-PIs E. Murphy, M. Fletcher), 1997-1999.

DOE/Environmental Management Science Program (EMSP):1995-1997, Intermediate-Scale Investigation of Microbial Transport and Aerobic Biodegradation of Organic Solutes in Saturated Heterogeneous Media (co-PI E. M. Murphy).

Publications

My papers and book chapters are presented here by date, and are categorized by topic on my website (http://faculty.engineering.ucdavis.edu/ginn/publications/by-topic/) into nine separate areas of ongoing activity: colloid bacterial transport, applied reactive transport, ureolytic calcite precipitation, theory of reactive transport and bioremediation, hydrological sustainability and age, inverse problems, water disinfection, multiredox biogeochemical kinetics/toxicity, and population dynamics. I am currently most active in the first five areas.

My publications listing is followed by a listing of technical reports. My work in technical reports includes some of the early work on Best Management Practices in hydrology. Also, my technical reports pertain to the multimedia risk assessment of alternative fuels in California, using a protocol that I established with co-PIs Tom McKone of UC Berkeley and Dave Rice retired, and our work in this area has impacted California state regulatory policy for new fuels including Biodiesel, Renewable Diesel, and Dimethyl Ether.

2014

- LeBorgne, T., T. R. Ginn, and M. Dentz, Impact of Fluid Deformation on Mixing-Induced Chemical Reactions in Heterogeneous Flows, Geophysical Research Letters, in press, 2014.
- Singh, G., S. S. Sengör, A. Bhalla, S. Kumar, J. De, B. Stewart, N. Spycher, T. R. Ginn, B. M. Peyton, R. Sani, Reoxidation of biogenic reduced uranium: A challenge toward bioremediation, Critical Reviews in Environ. Science and Technology, 44:391-415, 2014.
- Sutton, P., and T. R. Ginn, Sustainable in-well vapor stripping: a design, analytical model, and pilot study for groundwater remediation, J. Contam. Hydrol., 171:32-41, 2014.
- DeJong, J. T., B. C. Martinez, T. R. Ginn, C. Hunt, D. Major, and B. Tanyu, Development of a scaled repeated five-spot treatment model for examining microbial induced calcite precipitation feasibility in field applications, Geotechnical Testing Journal 37(3), 2014.
- Martinez, B. C., J. T. DeJong, T. R. Ginn, Bio-geochemical reactive transport modeling of microbial induced calcite precipitation to predict the treatment of sand in one-dimensional flow, Computers & Geotechnics, 58:1-13, 2014.
- Marçais, J., J.-R. de Dreuzy, T. R. Ginn, P. Rousseau-Gueutind, S. Leray, Inferring transit time distributions from atmospheric tracer data: Assessment of the predictive capacities of Lumped Parameter Models on a 3D crystalline aquifer model, J. Hydrology, in review 9/2014.
- McCallum, J., N. B. Engdahl, T. R. Ginn, P. G. Cook, Non-parametric estimation of groundwater residence time distributions: What can environmental tracer data tell us about groundwater residence time? Water Resour. Res. 50(3):2022-2038, 2014.
- Nassar, M. and T. R. Ginn, Impact of numerical artifact of the forward model in the inverse solution of density-dependent flow problem, Water Resources Research, 50, doi:10.1002/2013WR014672, 2014a.
- Nassar, M. and T. R. Ginn, Cauchy data requirement of the inverse problem of the mean age equation, Water Resources Research 50(4):3583-3588, 2014b.

2013

- Sengör, S. S., T. R. Ginn, C. J. Brugato, P. Gikas, Anaerobic microbial growth near thermodynamic equilibrium as a function of ATP/ADP cycle: The effect of maintenance energy requirements, Biochemical Engineering J., 81:565-72, 2013.
- Martinez, B. C., J. T. DeJong, T. R. Ginn, B. Montoya, T. H. Barkouki, C. Hunt, B. Tanyu, and D. Major, Experimental optimization of microbial-induced carbonate precipitation for soil improvement, J. Geotechnical and Geoenv. Eng. 139(4):587-598, 2013.
- Engdahl, N.B., T. R. Ginn, G. E. Fogg, Scalar dissipation rates in non-conservative transport systems, J. of Contam. Hydrol., 149C:46-60, 2013.
- Engdahl, N.B., T. R. Ginn, G. E. Fogg, Using groundwater age distributions to estimate the effective parameters of Fickian and non-Fickian models of solute transport, Adv. in Water Resour. 54:11-21, 2013.
- Ginn, T. R., M. K. Nassar, T. Kamai, K. Klise, V. Tidwell, and S. McKenna, On a recent solute transport laboratory experiment involving sandstone and its modeling, Water Resour. Res. 49(11):7327-7338, 2013.
- Ginn, T. R., Comment on "Comparison of Fickian and temporally nonlocal transport theories over many scales in an exhaustively sampled sandstone slab" by E. D. Major et al., Water Resour. Res. 49(2):1195-1195, 2013.
- Massoudieh A., N. Lu, X. Liang, T. H. Nguyen, T. R. Ginn, Bayesian process-identification in bacteria transport in porous media, J. Contam. Hydrol., 153, 78-91, 2013.
- Nelson K. E., T. R. Ginn, T. Kamai, Comment on "Extending applicability of correlation equations to predict colloidal retention in porous media at low fluid velocity," Environ Sci Technol., 47(14):8078-9, 2013.

2012

- Sengör, S.S., Gikas, P., Moberly, J. G., Peyton, B. M., Ginn, T. R., Comparison of single and joint effects of Zn and Cu in continuous flow and batch reactors, J. Chemical Tech. & Biotech. 87(3):374-380, 2012.
- Loboschefsky E., G. Benigno, T. Sommer, K. Rose, T. Ginn, A. Massoudieh, F. Loge , Individual-level and population-level historical prey demand of San Francisco Estuary Striped Bass using a bioenergetics model, San Francisco Estuary 10(1),1-22, 2012.
- Boutros, F. E., Y. S. Onsoy, T. R. Ginn, T. H. Harter, Richards equation-based modeling to estimate flow and nitrate transport in a deep alluvial vadose zone, Vadose Zone J., 11(4), 2012.
- Engdahl, N. E., T. R. Ginn, G. E. Fogg, Non-Fickian dispersion of groundwater age, Water Resour. Res. 48(7), Art. W07508, 2012.

2011

- Spycher, N.F., Issarangkun, M., Stewart, B.D., Sengör, S. S., Belding, E., Ginn, T.R., Peyton, B.M., Sani, R.K., Biogenic uraninite precipitation and its reoxidation by iron(III) (hydr)oxides: A reaction modeling approach, Geochimica et Cosmochimica Acta, 75 (16), pp. 4426-4440, 2011.
- Nelson, K.E., Ginn, T.R., New collector efficiency equation for colloid filtration in both natural and engineered flow conditions, Water Resour. Res. 47(5) Art. W05543, 2011.

- Barkouki, T.H., Martinez, B.C., Mortensen, B.M., Weathers, T.S., De Jong, J.D., Ginn, T.R., Spycher, N.F., Smith, R.W., Fujita, Y., Forward and Inverse Bio-Geochemical Modeling of Microbially Induced Calcite Precipitation in Half-Meter Column Experiments, Transport in Porous Media, 90(1):23-39, 2011.
- Martinez, B.C., Barkouki, T.H., Dejong, J.D., Ginn, T.R., Upscaling of microbial induced calcite precipitation in 0.5m columns: Experimental and modeling results, Geotechnical Special Publication, (211 GSP), pp. 4049-4059, 2011.
- DeJong, J.T., Soga, K., Banwart, S.A., Whalley, W.R., Ginn, T.R., Nelson, D.C., Mortensen, B.M., Martinez, B.C., Barkouki, T., Soil engineering in vivo: Harnessing natural biogeochemical systems for sustainable, multi-functional engineering solutions, J. Royal Society Interface, 8(54):1-15, 2011.
- Massoudieh, A., Ginn, T. R., The theoretical relation between unstable solutes and groundwater age, Water Resour. Res. 47, Art. 10523, 2011.
- Camarillo, M.K., Loge, F.J., Darby, J.L., Ginn, T.R., Basagaoglu, H., Foglia, L., Modeling the inactivation of microorganisms occluded in effluent wastewater particles to enhance operation of filtration and disinfection systems, Water Environment Research, 83(4):313-325, 2011.
- Massoudieh, A., Loboschefsky, E., Sommer, T., Ginn, T. R., Rose, K., Loge, F. J., Spatio-temporal modeling of striped-bass egg and larval movement and fate in the San Francisco Bay-Delta, Ecological Modelling, 222(19), 3513-3523, 2011.

2010

- Massoudieh, A., C. Crain, E. Lambertini, K. E. Nelson, T. Barkouki, P. L'Amoreaux, F. J. Loge, T. R. Ginn, Kinetics of conjugative gene transfer among bacteria attached to surfaces in granular porous media, J. Contam. Hydrol.,112(1-4): 91-102, 2010.
- Massoudieh, A., F. A. Bombardelli, T. R. Ginn, A biogeochemical model of contaminant fate and transport in river waters and Sediments, J. Contaminant Hydrol., 112(1-4),103-117, 2010a.
- Massoudieh A., D. Zagar. P. G. Green, C. Cabrera-Toledo, M. Horvat, T. R. Ginn, T. Barkouki, T. Weathers, F. A. Bombardelli, Modeling Mercury Fate and Transport in Aquatic Systems in Advances in Environmental Fluid Mechanics, edited by Igor Balaz, Carlo Gualtieri and Dragutin Mihailovic, World Scientific, New York, 2010b.
- Sani, R.K., G. Rastogi, J. G. Moberly, A. Dohnalkova, T. R. Ginn, N. Spycher, R. V. Shende, B. M. Peyton, The toxicity of lead to Desulfovibrio desulfuricans G20 in the presence of goethite and quartz, J. Basic Microbiology, 50(2):60-170, 2010.
- Massoudieh A. and T. R. Ginn, Colloid Facilitated Transport in Unsaturated Porous Media in Modelling of Pollutants in Complex Environmental Systems Volume II, edited by G.Hanrahan, ILM Publications, Volume II, UK. pp. 243-262, 2010.

2009

- Moberly, J. G., T. Borch, R. K. Sani, N. F. Spycher, S. S. Sengor, T. R. Ginn, B. M. Peyton, Heavy Metal-Mineral Associations in Coeur d'Alene River Sediments: A Synchrotron-Based Analysis, Water Air and Soil Pollution, 201(1-4):195-208 July 2009.
- Rastogi, G., R.K. Sani, B. M. Peyton, J. Moberly, T. R. Ginn, Molecular Studies on the Microbial Diversity Associated with Mining-Impacted Lake Coeur d' Alene Sediments, Microbial Ecology, 58(1):129-139 July 2009.

- Sengör, S. S., S. Barua, P. Gikas, T. R. Ginn, B. M. Peyton, R. Sani, N. Spycher, Influence of Heavy Metals on Microbial Growth Kinetics Including Lag Time: Mathematical Modeling and Experimental Verification, Environmental Toxicology and Chemistry, 28(10):2020-2029, 2009.
- Gikas, P., S. S. Sengör, T. R. Ginn, J. Moberly, B. M. Peyton, The effects of heavy metals and temperature on microbial growth and lag, Global Nest Journal, 11(3), pp. 325-332, 2009.
- Nelson, K. E. and T. R. Ginn, Comment on Particle Tracking Model for Colloid Transport near Planar Surfaces Covered with Spherical Asperities, Langmuir 25(21) : 12835-12836, 2009.
- Ginn, T. R., Generalization of the Multirate Basis for Time-Convolution to Unequal Forward and Reverse Rates and Connection to Reactions with Memory, Water Resour. Res. 45, Art. W12419, 2009.
- Ginn, T. R., H. Haeri, L. Foglia, and A. Massoudieh, Notes on groundwater age in forward and inverse modeling, Transport in Porous Media,79:117-134, 2009.
- Woolfenden L. and T.R. Ginn. Modeled Groundwater Age Distributions. Ground Water, 47(4): 547-557, 2009.
- Loge F. J., E. Lambertini, M. A.Borchardt, H. Basagaoglu, and T. R. Ginn, Effects of Etiological Agent and Bather Shedding of Pathogens on Interpretation of Epidemiological Data Used to Establish Recreational Water Quality Standards, Risk Analysis, 29(2): 257-266 2009.

2008

- Massoudieh A. and T. R. Ginn, Modeling Colloid-Enhanced Contaminant Transport in Stormwater Infiltration Basin Best Management Practices, Vadose Zone J., 7(4): 1215-1222, 2008.
- Basagaoglu H., P. Meakin, S. Succi, G. R. Redden, T. R. Ginn, Two-dimensional lattice Boltzmann simulation of colloid migration in rough-walled narrow flow channels, Phys. Rev. E, 77(3), 2008.
- Joyce B. A., W. W. Wallender, T. R. Ginn, Modeling the transport of spray-applied pesticides from fields with vegetative cover, Transactions of the ASABE, 51(6): 1963-1976, 2008.
- Massoudieh A. D, Ju, T. Young, T. R. Ginn, Approximation of a radial diffusion model with a multiple-rate model for hetero-disperse particle mixtures, J. Contaminant Hydrol., 97(1-2): 55-66, 2008.
- Massoudieh A., A. Mathew, T. R. Ginn, Column and batch reactive transport experiment parameter estimation using a genetic algorithm, Computers & Geosciences, 34(1):24-34, 2008.

2007

- Sengör, S. S., N. Spycher, T. R. Ginn, R. K. Sani, B. Peyton, Biogeochemical reactive-diffusive transport of heavy metals in Lake Coeur d'Alene sediments, Applied Geochemistry, 22(12): 2569-2594, 2007.
- Massoudieh A., A. Mathew, E. Lambertini, K. E. Nelson, T. R. Ginn, Horizontal gene transfer on surfaces in natural porous media: Conjugation and kinetics, Vadose Zone Journal 6(2): 306-315, 2007.

- Ginn T. R. and F. J. Loge, Dose-structured population dynamics, Mathematical Biosciences, 208(1): 325-343, 2007.
- Massoudieh A. and T. R. Ginn, Modeling colloid-facilitated transport of multi-species contaminants in unsaturated porous media, J Contam. Hydrology, 92(3-4):162-183, 2007.
- Nelson K. E., A. Massoudieh A, T. R. Ginn, E. coli fate and transport in the Happel sphere-in-cell model, Advances in Water Resources 30(6-7): 1492-1504, 2007.
- Ginn, T. R., Comment on "Groundwater age, life expectancy, and transit time distributions in advective-dispersive systems: 1. Generalized reservoir theory," by F. Cornaton and P. Perrochet, Adv. Water Resour., 30(4): 1056-1057, 2007.
- Dietrich J. P., F. J. Loge, T. R. Ginn, H. Basagaoglu, Inactivation of particle-associated microorganisms in wastewater disinfection: Modeling of ozone and chlorine reactive diffusive transport in polydispersed suspensions, Water Res., 41(10): 2189-2201, 2007.
- Ginn T. R., F. J. Loge, T. D. Scheibe, Explaining "noise" as environmental variations in population dynamics, Computing in Science and Engineering, 9(2): 40-49, 2007.
- Giudici, M., T. R. Ginn, C. Vassena, H. Haeri, L. Foglia, J.C. Refsgaard, K. Kovar, E. Haarder, E. Nygaard, A critical review of the properties of forward and inverse problems in groundwater hydrology, Proceedings of an International Conference on Calibration and Reliability in Groundwater Modelling: Credibility of Modelling, Copenhagen, Denmark, 9-13 September 2007.

2006

- Ginn T. R., T. Camesano, T. D. Scheibe, K. E. Nelson, T. P. Clement, B. D. Wood, Microbial Transport in the Subsurface, Encyclopedia of Hydrological Sciences, Edited by D. McKnight, John Wiley & Sons Publishing, New York, NY, 2006.
- Seeboonruang, U., and T. R. Ginn, Upscaling heterogeneity in aquifer reactivity via exposure-time concept: forward model, J. Contam. Hydrol., 84 (3-4): 127-154, 2006.
- Seeboonruang, U., and T. R. Ginn, Upscaling heterogeneity in aquifer reactivity via exposure-time concept: inverse model, J. Contam. Hydrol., 84(3-4): 155-177, 2006.
- Collier T.K., M. R. Arkoosh, L.L. Johnson, T. R. Ginn, F. J. Loge, The influence of chemical contaminants on disease ecology in Columbia River Chinook salmon, Marine Environmental Research, 62: S370-S370 Suppl. S, 2006.
- Cushman J. H. and T. R. Ginn, Reactive Contaminant Transport in the Saturated Zone: Review of Some Upscaling Approaches, J.W. Delleur (ed.), The Handbook of Groundwater Engineering, 2nd Edition, CRC Press, 2006. (book chapter revision).

2005

- Bendz, D., N. A. Paxeus, T. R. Ginn, F. J. Loge, Occurrence and fate of pharmaceutically active compounds in the environment, a case study: Höje River in Sweden: Journal of Hazardous Materials, 122: 195-204, 2005.
- Onsoy, Y., T. H. Harter, T. R. Ginn, W. Horwath, Spatial variability and transport of nitrate in a deep alluvial unsaturated zone, Vadose Zone J. 4: 41-54, 2005.
- Nakajima, H., B. Kutter, T.R. Ginn, M. A. Marino, An experimental study of LNAPL lens formation using a centrifuge, Proc. 16th Intl. Conf. Soil Mechanics and Geotechnical Engineering, 12-16 September in Osaka, Japan, 2005.

- Nelson, K. E. and T. R. Ginn, Colloid filtration theory and the Happel sphere-in-cell model revisited with direct numerical simulation, Langmuir, 21(6); 2173-2184, DOI: 10.1021/la048404i, 2005.
- Loge, F. J., M. R. Arkoosh, T. R. Ginn, L. L. Johnson, T. K. Collier, Impact of Environmental Stressors on the Dynamics of Disease Transmission, Environmental Science and Technology, 39 (18): 7329-7336 Sep. 15 2005.

2004

- Basagaoglu H., T. R. Ginn, and B. J. McCoy, Radial pore diffusion with nonuniform intraparticle porosities, ASCE Journal of Env. Engineering, 130(10): 1170-1179, 2004.
- Ginn, T. R., On the application of stochastic approaches in hydrogeology, Stochastic Environmental Research and Risk Assessment, 18(4): 282-284, 2004.
- Ginn, T. R., F. J. Loge, M. Arkoosh, Population balance modeling of dose in environmental mixtures, Proceedings of the XVth International Conference on Computational Methods in Water Resources (CMWR XV), June 13–17, 2004, Chapel Hill, NC, USA, Volume 1, Eds. C. T. Miller, M. W. Farthing, W. G. Gray, G. F. Pinder, pages 839-847, 2004.

2003

- Dietrich, J. P., H. Basagaoglu, F. J. Loge, T. R. Ginn, Preliminary Assessment of Transport Processes Influencing the Penetration of Chlorine Into Wastewater Particles and the Subsequent Inactivation of Particle-Associated Organisms, Water Res., 37(1):139-149, 2003.
- Ruppe, L. M. and T. R. Ginn, Groundwater Quality, in Encyclopedia of Water Science, pages 389-391, DOI 10.1081/E-EWS-120010304 July 28, 2003.
- Basagaoglu H., E. E. Chung, D. Gandhi, K. M. Scow, B. J. McCoy, T. R. Ginn, Rate parameters for MTBE degradation via a radial diffusion model, ASCE J. of Env. Engineering, 129(6):565-570, 2003.
- Basagaoglu H., E. E. Chung, D. Gandhi, K. M. Scow, B. J. McCoy, T. R. Ginn, Rate parameters for MTBE degradation via a radial diffusion model, Journal of Environmental Engineering, 129(6):565-570, 2003.

2002

- Basagaoglu, H., McCoy, B.J., Ginn, T. R., Loge, F.J., and Dietrich, J.P. A Diffusion Limited Sorption Kinetics Model Involving Multiple Identical or Non-Identical Particles, Adv. in Water Resour. 25(7):755-772, 2002.
- Basagaoglu, H., T. R. Ginn, B. J. McCoy, Formulation of a soil-pesticide transport model based on a compartmental approach, J. Contam. Hydrol., 56: 1-24, 2002.
- Basagaoglu, H., T. R. Ginn, B. J. McCoy, Comment on "Model coupling intra particle diffusion/sorption, nonlinear sorption, and biodegradatin process" by HK Karapanagioti, et al., J. Contam. Hydrol., 57: 303-310 2002.
- Basagaoglu, H., T. R. Ginn, C. T. Green, and B. J. McCoy, Transport in heterogeneous media: Tracer dynamics in complex flow networks, Am. Inst. Chem. Eng. J., 48:1122-1132, 2002.

- Ginn, T. R., B. D. Wood, K. Nelson, T. D. Scheibe, E. M. Murphy, and T. P. Clement, Processes in Microbial Transport in the Natural Subsurface, Advances in Water Research,25(8-12):1017-1042, 2002.
- Ginn, T. R., A travel-time approach to effects of size exclusion on colloid transport in porous media, 10.1029/2001WR000865, Water Resour. Res., 2002.
- Ginn, T. R. Streamtube-Ensemble Techniques for Multicomponent Reactive Transport" Stochastic Methods in Subsurface Contaminant Hydrology, ASCE Press, R. Govindaraju (ed.), 2002.

2001

- Ginn, T. R. Stochastic-convective transport with nonlinear reactions and mixing: Finite streamtube ensemble formulation for multicomponent reaction systems with intra-streamtube dispersion, J. Contam. Hydrol., 47:1-28, 2001.
- Ginn, T. R., E. M. Murphy, A. Chilakapati, U. Seeboonruang, Stochastic-convective transport with nonlinear reactions and mixing: Application to intermediate-scale experiments in aerobic biodegradation in saturated porous media, J. Contam. Hydrol., 48:121-149, 2001.
- Nelson, K. E., and T. R. Ginn, Theoretical investigation of bacterial chemotaxis in porous media, Langmuir, 17:5635-5645, 2001.
- Loge, F. J., R. W. Emerick, T. R. Ginn, and J. L. Darby, Association of coliform bacteria with wastewater particles: Impact of operational parameters of the activated sludge process, Water Research, 36(N1):41-48, 2001.

2000

- Ginn, T.R. On the distribution of multi-component mixtures over generalized exposure-time in subsurface flow and reactive transport: Theory and formulations for residence-time dependent sorption/desorption with memory, Water Resour. Res. 36:2885-2894, 2000a.
- Ginn, T.R. On the distribution of multi-component mixtures over generalized exposure-time in subsurface flow and reactive transport: Batch and column applications involving residence-time distributions and non-Markovian reaction kinetics, Water Resour. Res. 36:2895-2904, 2000b.
- Cushman, J. H. and T. R. Ginn, The fractional ADE is a classical mass balance with convoution-fickian flux, Water Resour. Res. 36(12):3763-3766, 2000.
- Emerick, R. W., F. J. Loge, T. R. Ginn, and J. L. Darby. Modeling the Inactivation of particle-associated coliform bacteria, Water Environment Research 72(4):432-438, 2000.
- Basagaoglu, H., T. R. Ginn, B. J. McCoy, M. A. Marino, A linear driving force approximation to a radial diffusive model, Am. Inst. Chem. Eng. J., 46(10):2097-2105, 2000.
- Murphy, E. M. and T. R. Ginn. Modeling microbial processes in porous media, Hydrogeology J., 8(1):142-158, 2000.

1999

- Ginn, T.R. On the distribution of generalized exposure-time in groundwater flow and reactive transport: Foundations; formulations for groundwater age, geochemical heterogeneity, and biodegradation, Water Resour. Res., 35(5):1395-1408, 1999.
- LaViolette, R. A., M. E. Watwood, T. R. Ginn, and D. L. Stoner, Spatial disorder and degradation kinetics in intrinsic biodegradation schemes, J. Physical Chem A, 103(23): 4480-4484, 1999.

1998

- Chilakapati A, Ginn T, Szecsody J. An analysis of complex reaction networks in groundwater modeling Water Resour. Res., 34 (7): 1767-1780, 1998.
- Cushman J. H. and T.R. Ginn, Reactive Contaminant Transport in the Saturated Zone" J.W. Delleur (ed.), The Handbook of Groundwater Engineering, CRC Press, 1998.

1997

- Ginn, T. R., and E. M. Murphy. Generalized chloride mass balance: Forward and inverse solutions for 1-dimensional tracer convection under transient flux, Water Resour. Res. 33:2065 2080, 1997.
- Murphy, E. M., T. R. Ginn, A. Chilakapati, T. Resch, J. Phillips, T. Wietsma, and C. M. Spadoni. The Influence of Physical Heterogeneity on Microbial Degradation and Distribution in Porous Media, Water Resour. Res., 33:1087-1104, 1997.
- DeFlaun M.F., C.J. Murray, W. Holben, T. Scheibe, A. Mills, T. R. Ginn, T. Griffin, E. Majer, and J.L. Wilson. Preliminary observations on bacterial transport in a coastal plain aquifer. 20:473-487, FEMS Microbiological Reviews, 1997.

Pre-1996

- Murphy, E. M., T. R. Ginn, and J. L. Phillips. Geochemical estimates of recharge in the Pasco Basin: Evaluation of the chloride mass-balance technique, Water Resour. Res. 32:2853-2868, 1996.
- Simmons, C. S., T. R. Ginn, and B. D. Wood. Stochastic-Convective Transport with Nonlinear Reaction: 1, Mathematical Framework. Water Resour. Res., 31:2675-88, 1995.
- Ginn, T. R., C. S. Simmons, and B. D. Wood. Stochastic-Convective Transport with Nonlinear Reaction: 2, Biodegradation with Microbial Growth. Water Resour. Res. 31:2689-2700, 1995.
- Wood, B.D., T.R. Ginn, and C. N. Dawson. Effects of Microbial Lag in Contaminant Transport and Biodegradation Modeling. Water Resources Research, 31:553-563, 1995.
- Cushman, J.H., X. Hu, and T.R. Ginn. Nonequilibrium Statistical Mechanics of Preasymptotic Dispersion. J. Statistical Physics, 75:859-878, 1994.
- Cushman, J.H. and T.R. Ginn. Non-Local Dispersion in Media with Continuously Evolving Scales of Heterogeneity. Transport in Porous Media, 13:123-138, 1993a.
- Cushman, J.H. and T.R. Ginn. On Dispersion in Fractal Porous Media. Water Resources Research, 29:3513-3515, 1993b.
- Ginn, T. R., J. H. Cushman, and M. H. Houck. A Continuous – Time Inverse Operator for Groundwater and Contaminant Transport Modeling I, Deterministic Case, Water Resour. Res., 26:241-252, 1990.

- Ginn, T. R., and J. H. Cushman. A Continuous – Time Inverse Operator for Groundwater and Contaminant Transport Modeling: II, Model Identifiability. Water Resources Research, 28:539-549, 1992.
- Ginn, T. R., and J. H. Cushman, Inverse methods for subsurface flow- a critical review of stochastic techniques, Stoch. Hydrology and Hydraulics 4(1):1-26, 1990.
- Ginn, T. R., and M. H. Houck, Calibration of an Objective Function for Optimization of Real-Time Reservoir Operations. Water Resources Research, 25:591-604, 1989.
- Cosby, B. J., R. B. Clapp, G. M. Hornberger, and T. R. Ginn. A Statistical Exploration into the Relationships of Soil Moisture Characteristics to the Physical Properties of Soils. Water Resources Res., 20:682-690, 1984.

Reports

1. Ginn, T.R., Information Review on Tropical Rainforest Environments: A Preliminary Sketch" Final report submitted to W. Alton Jones Foundation, Charlottesville, VA, 1982.

2. Neidrauer, C.J., A. Giorgini, and T.R. Ginn, Optimal Explicit Approximations to the Colebrook White Formula, CE-HSE-85-07, School of Engineering, Purdue University, Lafayette, IN, 44 pgs., 1985.

3. Goode, D.J., S.M. Neuder, R.A. Pennifill, and T.R. Ginn, Onsite Disposal of Radioactive Waste: Estimating Potential Groundwater Contamination, NUREG-1101, U.S.N.R.C., Division of Waste Management, Washington D.C.,Vol. 3, 1986.

4. Ginn, T.R. and E.U. Nzewi, McCarty Lane Improvement Project: Hydrologic Study, Final report submitted to H. Stewart Kline and Associates, Lafayette, Indiana, 1987.

5. Kincaid, C.T., J. DeVary, B. Bjornsted, and T.R. Ginn, A Review of Hanford Waste Sites for the Purpose of Identifying Databases Suitable for Calibration and Validation of Vadose Zone Flow and Transport Models, PNL Letter Report, April, 1993.

6. Skeen, R.S. and T.R. Ginn, Interim Letter Report: Tinker Air Force Base Southwest Tank Site Bioventing Design Simulation, PNL-24352, April, 1993.

7. Ginn, T. R., Scale Averaging of Effective Parameters, PNL Annual Report for 1992 to the DOE Office of Energy Research, Part 2, Environmental Sciences, prepared for the U.S. Department of Energy, pp. 183-189, 1993.

8. Simmons, C.S., R.J. Lenhard, T.R. Ginn, and J.W. Cary, Subsurface Organic Fluid Flow, PNL Annual Report for 1992 to the DOE Office of Energy Research, Part 2, Environmental Sciences, prepared for the U.S. Department of Energy, pp. 111-126, 1993.

9. Murphy, E.M., B.D. Wood, T.R. Ginn, F.J. Brockman, R.J. Lenhard, and A.J. Valocchi, Intermediate-Scale Subsurface Transport of Co-Contaminants, PNL Annual Report for 1992 to the DOE Office of Energy Research, Part 2, Environmental Sciences, prepared for the U.S. Department of Energy, pp. 48-61, 1993.

10. Murphy, E.M. and T.R. Ginn, Intermediate-Scale Investigations of Interactive Subsurface Processes, PNL Annual Report for 1993 to the DOE Office of Energy Research, Part 2, Environmental Sciences, prepared for the U.S. Department of Energy, pp. 11-15, 1994.

11. Ginn, T.R., A Brief Review of Bacterial Transport in Natural Porous Media, Prepared for the U.S. Department of Energy, Pacific Northwest National Lab, PNL-10876, 23p., 1995.

12. Ginn, T.R. and E.M. Murphy, Generalized Chloride Mass Balance: Forward and Inverse Solutions for One-Dimensional Convection Under Transient Flux, PNNL-11074, Battelle Pacific Northwest Lab, 33p, 1996.

13. Ginn, T. R., E.M. Murphy, M.F. Fletcher, J.H. Cushman, D.M. Friedrich, and D. R. Boone, Dynamics of Coupled Contaminant and Microbial Transport in Heterogeneous Porous Media, Science to Support DOE Site Cleanup: The Pacific Northwest National Lab Environmental Management Science Program Awards, Fiscal Year 1999 Mid-Year Progress Report, PNNL-11899, Battelle Pacific Northwest Lab, pp. 3.1-3.11, 1998.

14. Ginn, T. R., E.M. Murphy, M.F. Fletcher, and J.H. Cushman, Dynamics of Coupled Contaminant and Microbial Transport in Heterogeneous Porous Media, Science to Support DOE Site Cleanup: The Pacific Northwest National Laboratory Environmental Management Science Program Awards, Fiscal Year 1999 Mid-Year Progress Report, May 1999, PNNL-12208, Battelle Pacific Northwest Lab, pp. 4.1-4.13.

15. Onstott, T C., M F. DeFlaun, D L. Balkwill, W. E. Holben, T.R. Ginn, T D. Scheibe, D Swift, T Griffin, E Majer W. Johnson, Enhancement of Bacterial Transport in Aerobic and Anaerobic Environments: Assessing the Effects of Metal-Oxide Chemical Heterogeneity, DOE/NABIR Annual Report, Program Element 6, Bacterial Transport, 2000.

16. Murphy, E M., T R. Ginn and B. D. Wood, The Influence of Heterogeneity and Growth on Microbial Transport in Saturated Porous Media, DOE/NABIR Annual Report, Program Element 6, Bacterial Transport, 2000.

17. Participating co-author among 42 workshop participants, A National Roadmap for Vadose Zone Science and Technology, Dept. of Energy Report, DOE/ID-10871, 2001.

18. Ginn, T. R. and L. Woolfenden, Application of a New Model for Groundwater Age Distributions: Modeling and Isotopic Analysis of Artificial Recharge in the Rialto-Colton Basin, California, Annual Report for FY 2003 University of California WRC Project W-956- Research Category I, Hydrology, Climatology and Hydraulics, 2002.

19. Harter, T., Y. Onsoy, T. R. Ginn, Evaluating the Impact of Nutrient Management on Groundwater Quality in the Presence of Deep Unsaturated Alluvial Sediment, Report submitted to the State of California Department of Food and Agriculture Fertilizer Research Education Program, 2003.

20. Ginn, T. R. and L. Woolfenden, Application of a New Model for Groundwater Age Distributions: Modeling and Isotopic Analysis of Artificial Recharge in the Rialto-Colton Basin, California, Annual Report for FY 2003 University of California WRC Project W-956- Research Category I, Hydrology, Climatology and Hydraulics, 2003.

21. Ginn, T. R., Review Letter Report on 'BMP Retrofit Pilot Program: Final Report', for Caltrans Environmental Program, 2003.

22. Ginn, T. R., Review Letter Report on 'Chromium Background Study at Hinkley Site' for California WQCB, Lahontan Region, 2004.

23. Ginn, T. R., Application of a New Model for Groundwater Age Distributions: Modeling and Isotopic Analysis of Artificial Recharge in the Rialto-Colton Basin, California, *Hydrovisions*, Groundwater Resources Association of California, Volume 13, No. 2 Summer 2004, pages 11, 20.

24. Ginn, T. R., A. Massoudieh, S. Sengör, Phase I: Modeling Stormwater Pollutant Fate and Transport in Infiltration Pond BMPs, Summer 2004.

25. Diaz, M., T. R. Ginn, A. Massoudieh, Phase II: Modeling Highway Pollutant Fate and Transport from Pavement to Channel: Preliminary Modeling of the San Onofre Site Data, Caltrans report CTSW-RT-05-73-10.2, Summer 2005.

26. Onsoy, Y. S., T. Harter, T. R. Ginn, J. W. Hopmans, W. R. Horwath, Evaluating the Impact of Nutrient Management on Groundwater Quality in the Presence of Deep Unsaturated Alluvial Sediment, Final Report to CA Dept. Food and Agriculture, Fertilizer Research & Education Program, 2005.

27. Diaz, M.E., Massoudieh, A., and T. R. Ginn, Phase II: Modeling highway pollutant fate and transport from pavement to channel: Preliminary Modeling of the San Onofre Site Data, Report ID: CTSW-RT-05-73-10.2, Sacramento, CA, 2005.

28. Ginn, T.R., Massoudieh, A., Diaz, M. E., and S. Sengör, Mathematical Modeling of Fate and Transport of Aqueous Species in Stormflow Entering Infiltration Basin., Sacramento, CA. 2005.

29. Diaz, M.E., Massoudieh, A., Karen, L. F. C. H., Mathew, A., and T. R. Ginn, Impacts of Infiltration Basin Study: Improve Infiltration Model, Stage 1, Report ID: CTSW-RT-06-168-17.1D, Sacramento, CA, 2006.

30. Knapp, T. and T. R. Ginn. Summary of Drinking Water Disinfection Project for the Community of Tijera, Panama. Report to Tahoe Douglas Rotary, 2007.

31. Diaz, M. E., A. Massoudieh, Karen Lam Fat Cheong Him, Ann Mathew, Timothy R. Ginn, Mathematical Modeling of Fate and Transport of Aqueous Species in Stormflow Entering Infiltration Basin, Caltrans, CTSW-RT-06-168-17.2, 2007.

32. Massoudieh, A., T. R. Ginn, M. E. Diaz, K. L. F. C. Him, and T. Knapp, Mathematical Modeling of Fate and Transport of Aqueous Species in Stormflow Entering Infiltration Basin: Literature Review for Model Validation, Caltrans, CTSW-RT-06-168-17.3, 2007.

33. Massoudieh, A., T. Knapp, and T. R. Ginn, Mathematical Modeling of Fate and Transport of Aqueous Species in Stormflow Entering Infiltration Basin: Model Validation Report, Caltrans, CTSW-RT-06-168-17.4D

34. Ginn, T. R., T. McKone, and D. Rice, Guidance Document and Recommendations on the Types of Scientific Information to be Submitted by Applicants for California Fuels Environmental Multimedia Evaluations Prepared for the Multimedia Working Group by UC Berkeley, UC Davis, and Lawrence Livermore National Laboratory, UCRL-AR-219766, 2008. http://www.arb.ca.gov/fuels/multimedia/guidancedoc.pdf

35. Ginn, T.R., H. Haeri, and L. Foglia, Comparative inverse modeling with combination of multiphysics codes and parameter estimation snap-on tools, Report - University of California Water Resources Center, (112), pp. 2-4, 2009.

36. Rice, D., T. McKone, and T. R. Ginn, California Renewable Diesel Multimedia Evaluation Tier I Final Report, 2010 http://www.arb.ca.gov/fuels/multimedia/meetings/meetings.htm

37. Ginn, T. R., T. Hatch, J. Miller, K. M. Scow, A. Epple, M. B. Johnson, L. Rastagarzadeh, T. Schetrit, T. H. Barkouki, and V. Nino, California Biodiesel Multimedia Evaluation Final Tier I Report, 2010 http://www.arb.ca.gov/fuels/multimedia/meetings/meetings.htm

38. Ginn, T. R., T. McKone, and D. Rice, California E85 Multimedia Evaluation Final Tier I Report, 2012 (Rulemaking postponed)

39. McKone, T., T. R. Ginn, and D. Rice, California Biodiesel Multimedia Evaluation Tier III Final Report: Biodiesel, 2013. http://www.arb.ca.gov/fuels/multimedia/meetings/meetings.htm

40. Ginn, T. R., T. McKone, and D. Rice, California Renewable Diesel Multimedia Evaluation Tier III Final Report: 2013. http://www.arb.ca.gov/fuels/multimedia/meetings/meetings.htm.

Professional Service, Editing & Affiliations

Editor: (with G. S. Rao, V. Gupta): *ASCE J. Hydrologic Engineering* (2004-8)
Assoc. Editor: *Water Resources Research*, (1994-2003),
Stochastic Environmental Research and Risk Assessment (1995-2007),
Adv. Water Resources (2000-2008), *ASCE J. Hydrol. Eng.* (1999-2004)
Acting Editor: *Stochastic Hydraul. & Hydrol.* Vol. 12, Nos. 3, 5 (1998), "Inverse Problems"
Advances in Water Resources, with B. D. Wood and D. Tartakovsky, (2009) "Macrodispersion in Heterogeneous Porous Media."

Member of: ASCE, AGU, GSA, SIAM.
ASCE: Tech. Comm., Water Res. Systems (1996-), Groundwater Symp. Comm., 2005-, Task Committee on Comp'l Issues in Optimal Aquifer Remediation (1998-2000), Subcommittee on Probabilistic Methods in Subsurface Transport (1997-1999).

Service Activities

Civil & Environmental Engineering Department, UC Davis

Search committees: Structures position 1998, Water position 2001, Water position 2003
Manager, CH2MHill corporate sponsorship of computational lab, 2001-2003
Coordinator, UCD CEE Water Seminar Series (8 speakers), 2002-2003.
Undergraduate Curriculum Committee, 2003-2004
Water Group Coordinator, 2000-3, 2004-9.
Graduate Program Committee, 2001-3, 2004-2009.
U.S. Corps of Engineers Hydraulic Eng. Ctr. Internship Coordinator, 2000-3, 2004-9.

College of Engineering, UC Davis

Ad Hoc Committee, 2002
Ad Hoc Committee, 2006 (Chair).
College Awards Committee, 2006-9 (Chair, 2008/9).
College Executive Committee 2002-4.
College Research Committee, 2008-10.
College Faculty Personnel Committee 2011-2014

College of Agricultural and Environmental Sciences, UC Davis

Ad Hoc Committee, 2014

External Academic

Tenure Review, James Saiers, Yale University, 2004.
Tenure Review, Dave Hyndman, Michigan State University, 2006.
Tenure Review, Roy Haggerty, Oregon State University, 2008.
Tenure Review, Gregg R. Davidson, University of Mississippi, 2009.
Tenure Review, David Benson, Colorado School of Mines, 2009.
Tenure Review, Arash Massoudieh, Catholic Univ. of America, 2013.
Tenure Review, Robin Gerlach, Montana State University, 2013.
Tenure Review, Haluk Beyenal, Washington State University, 2014.
Tenure Review, Li Li, Penn State University, 2014.
Masters Thesis Examiner, Sutapa Barua, Montana State University, 2007.
Member of Master's committee, Raghu Nandan Gurram, Chemical Engineering, South Dakota School of Mining and Technology, 2009-
Doctoral Defense Examiner, J. Dietrich, Washington State University, 2003.
Doctoral Defense Examiner, H. Rao, Indian Inst. of Science, Bangalore, India, 2004.
Doctoral Defense Examiner, A. Chaudhuri, Indian Inst. of Science, Bangalore, India, 2006.
Doctoral Examiner, Steven Tomlinson, Swinburne University of Technology, 2008.
Doctoral Examiner (Chair), Fulvia Baratelli, University degli Studi di Milano, 2012.

Professional

Editor, Groundwater Section, *ASCE J. Hydrologic Engineering*, 2004-9.
Associate Editor:
Advances in Water Resources 2000-2010
Water Resources Research, 1994-2003
Stochastic Hydraulics & Hydrology (1995-1998 - journal converted to:)
Stochastic Environmental Research and Risk Assessment (1998-2009),
ASCE J. Hydrologic Engineering, 1999-2004
Special Issue Editor:
Stochastic Hydraul. & Hydrol. Vol. 12, Nos. 3, 5 (1998), "Inverse Problems"
Advances in Water Resources, with B. D. Wood and D. Tartakovsky,
"Macrodispersion in Heterogeneous Porous Media," 2007/8
Reviewer, Journal Articles:
Advances in Water Resources
Aquatic Sciences
ASCE J. Engineering Mechanics
ASCE J. Hydrologic Engineering
ASCE J. Hydraulic Engineering
ASCE J. Water Resources Planning and Management
Environmental Science and Technology
Chemical Engineering Communications
Computers & Geosciences
Computing in Science and Engineering
Ecological Engineering
Environmental Science and Technology
Geochemical Transactions
Ground Water
The Holocene
J. of Applied Microbiology
J. Computational Physics
J. Contaminant Hydrology
J. Environmental Quality
J. Engineering Mechanics
J. Hazardous Materials
J. Hydrology
J. Mathematical Biosciences
Letters in Applied Microbiology
Mathematical Biosciences
Microbial Ecology
Proceedings of the National Academy of Sciences
Separation and Purification Technology
SIAM: Multiscale Modeling and Simulation
Transport in Porous Media
Vadose Zone Journal
Water Research
Water Resources Research

Reviewer, Book Chapters

ASCE Stochastic Methods in Subsurface Contaminant Hydrology, ed. R. Govindaraju 1999-2000.

Horizontal Gene Transfer - Genomes in Flux, eds. P. Gogarten, L. Olendzenski and M. Gogarten (2008)

Reviewer, Proposals U.S.

Department of Defense, SERDP, 1998-99, 2013
Hispanic Collaborative for Research & Education in Science & Tech., 1998-9
NASA Gravitational Ecology/Shuttle Flight Experiment Program, 1998-2000
NSF Applied Mathematics and Computational Mathematics 1999-2000
University of California Water Resources Center, 1998-99
National Institute for Water Resources, 1999, 2002, 2004
DOE ERSP, panel reviewer, (44) 2007.
DOE EMSL, mail reviewer, EMSL Refresh plan (capital equipment) 2007.
DOE ERSD Science Focus Area Panel Review (7) 2008
DOE ERSD Transuranic Science Focus Area (SFA) Review (6) 2009
NSF Hydrologic Sciences, various: Panel Reviewer Spring 2013, Fall 2013.
NSF Early Career Awards, various
NSF Geosciences, various
NSF Collaborations in Mathematical Geosciences, various
NSF Geochemistry and Low-Temperature Geochemistry, various
University of California Water Resources Center, various.

Reviewer, Proposals International:

Italian Ministry of University and Scientific Research (MIUR), Projects of National Interest (PRIN) 2008-present
UC Berkeley Institute for European Studies, France-Berkeley Fund 2009
Israeli-Palestinian Science Organization, 2006.
Icelandic Research Fund, 2013.
French MeasUrE Research Program, 2012.

Reviewer, Research Program National:

Idaho NEEL Chemistry of Environmental Surfaces Research Area, 1998-99.
Idaho NEEL, University Research Consortium Program, 1999-2000
U.S. Deparment of Energy (DOE), Vadose Zone Roadmapping Effort, 1999-2000
DOE/BER Workshop on "Complex Systems Science Relevant to Contaminant Fate and Transport," August 3-5, 2009.

Co-convened sessions at conferences:

2003 ASCE EWRI meeting, Chicago, IL: "Groundwater Contamination and Remediation"
2005 Fall AGU meeting, San Francisco CA: "One Hundred Years of Dispersion Research: Past Accomplishments, Current Research, and Future Directions"
2005 Fall AGU meeting, San Francisco CA: "Discussions on Metahydrogeology: Research Stocktaking or Identity Crisis?"
2007 Fall AGU meeting, San Francisco CA: "Recent Advances in Groundwater Hydrology Posters"

2008 Fall AGU meeting, San Francisco CA: "Hydrology: General Contributions"
2009 Fall AGU meeting, San Francisco CA: "Challenges and Progress in Regional Groundwater Flow, Transport, and Reactive Transport Modeling"
2012 Fall AGU meeting, San Francisco CA: "Characterization of Groundwater Systems"
2012 4th International Interpore Conference on Porous Media & Annual Meeting of the International Society for Porous Media, Purdue University, West Lafayette, Indiana, "Challenges and solutions in microbially induced calcite precipitation: theory, experiment, and simulation"
2012 4th International Interpore Conference on Porous Media & Annual Meeting of the International Society for Porous Media, Purdue University, West Lafayette, Indiana, "Mixing and reactive transport in natural and engineered porous media"
2013 Fall AGU meeting, San Francisco CA: "Biogeosciences: Microbial adaptation and gene transfer in the environment"

Conference Program Planning:

Hydrology Program for the AGU Fall Meeting, 2007 and 2008 (chair)
-arranged 75 sessions and ~2000 presentations (oral and poster) at planning sessions held at AGU headquarters in Washington D.C.

Conference Organization:

National Ground Water Association, September 2005 Theis Conference—Groundwater Age: Estimation, Modeling, and Water Quality Sustainability, Lake Tahoe, California, with G. Fogg (UCD), N. Plummer (USGS), T. Parker (Schlumberger), ~50 presentations (oral and poster)

Workshop/Shortcourse Participation U.S. and International:

"Subsurface Processes at the Mesoscale," A Workshop to Evaluate Research Direction and Facility Needs in Support of the DOE Environmental Management Program, hosted by the Idaho National Engineering and Environmental Laboratory, Salt Lake City, UT, May 8- 9, 2000.

"Slovenia and U.S. Workshop on Environmental Science and Engineering," U. S. NSF/Rep. Slovenia Ministry of Higher Education, Ljubljana, Slovenia, September 27-30, 2006.

"NSF Summer School on Geophysical Flows and Reactive Transport," U.S. NSF, Purdue University, August, 2006.

"CNRS Second Summer School on Flow and Transport in Porous and Fractured media: Development, protection, management, and sequestration of subsurface fluids," Cargèse, Corsica, 16-28 August, 2010. Delivered 3 lectures.

"Reactive Transport Modelling" Univ. Tübingen Short course held 30 Sept. to 4 October 2013 in Bad Boll, Germany organized by O. Cirpka. Delivered 3 lectures, assisted with projects.

Workshop/Shortcourse Design and Construction International:

"Workshop on reactive transport in porous media: Applications to contaminant hydrology, bioremediation, colloid transport,and groundwater age. Constructed and delivered 25 hours of lecture over 11-15 October 2010 at

Universita degli Studi di Milano in Milan, Italy.

Agency Consulting/ Public Service

Reviewer of Best Management Practices Retrofit Pilot Program: evaluated field and lab data from comparative study of stormwater quality control devices, Caltrans, 2003.

Reviewer of Chromium Background Study at Hinkley Site: evaluated data on chromium concentrations in soil samples taken in the vicinity of the Hinkley, CA site for California Water Quality Control Board, Lahontan Region, 2004.

Consultant: Stormwater pollutant fate & transport in infiltration pond best management practices Phase I, developed and applied mathematical models of stormwater and multiple metal solute infiltration and sorption in infiltration ponds. Caltrans, 2004. Phase II, Applied modeling of stormwater infiltration and metals fate and at the San Onofre Site, CA

Consultant, CalEPA/Interagency Working Group, Alternative Fuels Multimedia Risk Assessment Guidelines, 2004 -2008: (http://www.arb.ca.gov/fuels/multimedia/080608guidance.pdf)

Co-Investigator and co-author of Multi-Media Risk Assessment (MMRA) Guidelines, and application of MMRA to alternative fuels developed in California, including biodiesel, renewable diesel, e-85 gasoline mixtures, dimethyl ether, biomethane and ongoing.

Private Consulting

Consultant, Hydrogeologic, Inc., Helena MT. Critiqued and assisted in construction of regional scale groundwater models for evaluation of impacts of mining operations planned in the Cabinet Mountains Wilderness Area, MT. 2012-2014

Invited/Plenary Lectures and Awards

Invited Lectures at National Venues:

"Effects of Chemical Heterogeneity on Subsurface Fate and Transport Involving Biotic Reaction Systems: Two Examples," Fall American Geophysical Union, December, 1998.

"Iterative experiments and modeling ISEB4: Learning from mistakes," INEEL Workshop on Scaling of Coupled Processes: Grand Challenges Requiring Experiments at Intermediate Scales,' Salt Lake City, Utah, August, 2000.

"The Concept of Exposure Time for Non-Markovian Kinetics in Modeling Bacterial Attachment-Detachment With Memory," Fall American Geophysical Union, California, December, 2000.

"The Concept of Exposure Time for Non-Markovian Kinetics in Modeling Bacterial Attachment-Detachment With Memory" Fall 2000 American Geophysical Union Meeting in San Francisco, California, December 15-19, 2000.

“Memory and exposure-time in subsurface fate and transport," Spring 2001 Campus-Wide Hydrology Seminar Series, Oregon State University, Corvallis, OR.

"Memory and exposure-time in subsurface fate and transport," Fall 2001 Interdisciplinary Seminar Series, Washington State University, Pullman, WA, 26 November, 2001.

“Memory and exposure-time in subsurface fate and transport,” LBL Center for Environmental Biotechnology, May 2001.

"Kinetics of Gene Transfer on Surfaces in Porous Media,” Invited lecture, The ASA-CSSA-SSSA International Annual Meeting, November 6-10, 2005, Salt Lake City, Utah.

“Kinetics of conjugative gene transfer on surfaces in granular porous media,” Invited lecture, Fall 2005 American Geophysical Union Meeting, December 5-9, 2005, San Francisco, California.

“Report on an Informal Survey of Groundwater Modeling Practitioners About How They Quantify Uncertainty: Which Tools They Use, Why, and Why Not.” Fall 2006 American Geophysical Union Meeting, December 11-15, 2006, San Francisco, California.

“Horizontal Gene Transfer in Porous Media,” 2008 Kirkham Conference: Soil Physics – Research on the Frontiers of Earth’s Life Support System, 25-26 February 2008, UC Davis, Backup invitee for missing invited speaker.

“How Important Is Uncertainty Quantification to Ground Water Modeling Practitioners: Which Tools Do They Use, and Why (or why not) ?” NGWA Groundwater Summit, April 19-23, 2009 Tucson, AZ.

“A relation between multirate mass transfer models and reaction kinetics with true memory”, Fall 2009 American Geophysical Union Meeting, San Francisco, CA, 14-18 December, 2009

“Collector Efficiency Equations for Colloid Filtration in Saturated Porous Media” Fall 2010 American Geophysical Union Meeting, San Francisco, CA, 14-18 December, 2010

“Particle tracking-based modeling and column data tells about filtration theory performance, nano-colloid filtration and deposited colloid distributions,” Invited lecture at Johns Hopkins University Department of Geography & Environmental Engineering, M. Gordon Wolman Seminar Series, 21 February, 2012.

"In Search of Governing Equations for Mixing Measures" Invited lecture at Stanford University Environmental Fluid Mechanics & Hydrology Seminar Series, 26 Nov., 2012.

"Conservation of material over space, time, and exposure-time" Invited lecture at Notre Dame University Civil & Environ. Eng. and Earth Sciences Dept., 10 September 2013.

Invited **Plenary** Lectures at National Conferences:

"Geochemical Heterogeneity and Reactive Transport: Review and Lagrangean Upscaling," Invited lecture, Society for Industrial & Applied Mathematics Conference on Mathematical & Computational Issues in the Geosciences (GS03), March 17-20, 2003.

"Much Ado About Upscaling: Microbiology to Engineering Science and Back Again," International Society for Subsurface Microbiology 2005 Meeting, Jackson Hole, Wyoming August 14-19, 2005.

Invited **International** Lectures:

"Streamtube-ensemble methods for upscaling subsurface reactive transport in heterogeneous media," Joint Canada, USA, Mexico Meeting on Applications of Physics to Porous Media, Puerto Vallarta, Mexico, 1999.

"Multidisciplinary studies of in situ bacterial transport experiments and modeling at the Oyster, VA, USA site." Universita' degli Studi di Milano, Milan, Italy, July 2002.

"Generalized Exposure-Time In Subsurface Flow and Transport Accounting for generalized aging", Universita' degli Studi di Milano, Milan, Italy, July 2002.

"Colloid filtration in saturated porous media revisited: Lagrangean analysis of the Happel sphere-in-cell model,"1st LNCC (Laboratório Nacional de Computação Científica) Meeting on Computational Modeling, August 9-13, 2004, Petropolis, Brazil.

"Modeling biogeochemical reactive diffusive transport of heavy metals in Lake Coeur d'Alene sediments: Biotic/abiotic coupling and toxicity of metals to microbial activity. Abstracts, Slovenia and U.S. Workshop on Environmental Science and Engineering, September 27-30 2006, Ljubljana, Slovenia (Invited, platform).

"The Role of Benthic and Suspended Sediment Dynamics on Fate of Contaminants in Streams:A Modeling Approach," Hg4: An International Workshop - Hg Mobilization, Methylation, Modeling, and Mitigation, 1-5 September 2008, Ljubljana, Slovenia.

"Primer on Mathematical Modeling of Multicomponent Reactive Transport: Differential-Algebraic Systems" 2nd summer school on 'Flow and Transport in Porous and Fractured media' at the CNRS center in Cargèse, Corsica (www.iesc.univ-corse.fr), 16 -28 August 2010, funded by the European Marie Curie network IMVUL and CNRS (www.cnrs.fr), Cargèse, Corsica 2010 (I was the one of two US-native of 35 lecturers).

"The Link Between Radiometric Tracer Data and Groundwater Age Distributions" Second Summer School on Flow and Transport in Porous and Fractured media: Development, protection, management, and sequestration of subsurface fluids, Cargèse, Corsica, 16-28 August, 2010.

"Groundwater Age: Radiotracers and the Governing Equation for Age Distributions" Invited lecture, CNRS & University Rennes #1, Geosciences, 21 May-5 June, 2012.

"Review of Subsurface Environmental Microbiology, Focus on Modeling" Invited lecture, CNRS & University Rennes #1, Geosciences, 21 May-5 June, 2012.

"Microbially-Mediated Calcite Precipitation" Invited lecture, CNRS & University Rennes #1, Geosciences, 21 May-5 June, 2012.

"Colloid/Microbial Transport," Invited lecture at "Reactive Transport Modelling" Univ. Tübingen Short course in Bad Boll, Germany, 30 Sept. to 4 October, 2013.

"Exposure-Time: From Groundwater Age to Miscimetry in Reactive Transport," Invited lecture at "Reactive Transport Modelling" Univ. Tübingen Short course in Bad Boll, Germany, 30 Sept. to 4 October, 2013.

"Travel-time/Groundwater Age/Residence-Time Distribution-Based Reactive Transport," Invited lecture at "Reactive Transport Modelling" Univ. Tübingen Short course in Bad Boll, Germany, 30 Sept. to 4 October, 2013.

Award: University California, Davis:

College of Engineering Outstanding Engineering Mid-Career Award, 2010.