

Curriculum Vitae

Name: Joel Ducoste

Date: 11/15/17

1. Include Education (Degrees, Dates, Institutions, Locations):

Ph.D., Environmental Engineering, 1996, University of Illinois, Urbana-Champaign, IL
M.Eng., Mechanical Engineering, 1989, Rensselaer Polytechnic Institute, Troy, NY
B.S., Mechanical Engineering, 1988, Rensselaer Polytechnic Institute, Troy, NY

2. Professional Experience (Titles, Organizations, Locations, Dates of Employment):

Director of College Graduate Student Recruitment and Advancement, NCSU, 1/18-Present
Professor of Civil Engineering, North Carolina State University, 8/10 – Present
Associate Professor of Civil Engineering, North Carolina State University, 8/04 – 8/10
Assistant Professor of Civil Engineering, North Carolina State University, 8/98 – 8/04
Water Treatment Process Engineer, CH2M HILL, 1996-1998
Graduate Research Assistant, University of Illinois, 1991-1996
Manufacturing Engineer, GE Aircraft Engines, 1989-1991

3. Scholarly and creative activities: (INSTRUCTION: ADD/DELETE ACTIVITY TYPES TO THE LIST BELOW AS APPLICABLE; USE THE TAB KEY TO ADD ADDITIONAL ROWS; ACTIVITY TYPE EXAMPLES) (ITEMS IN BOLD DISPLAY CATEGORIES WITH SIGNIFICANT CHANGE SINCE LAST PA2 PERIOD)

<i>Type</i>	<i>Number</i>
Refereed Journal Article (Published)	67
Refereed Journal Editorial (Published)	1
Refereed Journal Article (Submitted or in revision)	3
Edited Special Issue Refereed Journal (Published)	1
Technical Report, Refereed	8
Conference Proceeding, Refereed	1
Conference Proceeding Edited Book, Refereed	1
Non-Refereed Journal Article (Published)	3
Conference Proceedings	76
Research Presentation, Invited (without paper)	53
Conference Presentations (without paper)	46

4. Professional Society Memberships:

- 1) Member, American Academy of Environmental Engineers and Scientists (2016-Present)
- 2) Member, Water Environment Federation (2011-Present)
- 3) Member, International Ultraviolet Association (2006-Present)
- 4) Member, American Water Works Association (1992-Present)
- 5) Member, Association of Environmental Engineering and Science Professor (1999-Present)
- 6) Member, National Society of Professional Engineers (1991-2002)
- 7) Member, American Society of Engineering Education (2003-2005)

5. Scholarly and Professional Honors:

<i>American Academy of Environmental Engineering and Science Excellence in Environmental Engineering and Science University Research Honor Award</i>	2017
<i>Board certified environmental engineer through eminence</i>	2016
<i>Keynote Speaker British Water FOG Forum, Cranfield UK</i>	2015
<i>NSF Advance Scholar Leadership Program</i>	2012
<i>National Academy of Engineering KECKs Future Initiative Symposium Participant</i> (100 engineers selected to join)	2011
<i>NSF Advance Scholar</i>	2009
<i>National Academy of Engineering Frontier of Engineering Japan Symposium Participant</i> (30 engineers selected from the USA to join 30 from Japan)	2008
<i>Fulbright Fellow</i> (Council for International Exchange of Scholars award)	2006
<i>FWO Visiting Faculty Scholar at Ghent University, Belgium</i> (Visiting research award provided by the National Science Foundation, Belgium)	2006
<i>NSF Career Award</i> (The award is the highest honor given by NSF to young university faculty in science and engineering)	2001
<i>Ralph Metcalfe Chair for Minority Scholars at Marquette University</i> (Visiting lecturer award) (The primary purpose of the Metcalfe Chair is to bring to Marquette University outstanding African-American and other minority scholars and professionals to interact with and enrich the academic life of Marquette University's students and faculty)	2000

Professional Licenses: Engineer-in-Training: Ohio, 1991

6. Professional service on campus: (INSTRUCTION: LIST ONE ON-CAMPUS SERVICE PER LINE, INCLUDE SERVICE DATES; NOTE LEADERSHIP ROLE IF HELD, E.G., CHAIR, CO-CHAIR, ETC.)

North Carolina State University and College of Engineering Committees:

- 1) University Diversity Advisory Committee (UDAC) (2014-2016)
- 2) University Faculty Liaison (OIED) (2014-2016)
- 3) NSF Advance Scholar (Part of Developing Diverse Departments (3-D) program at NC STATE <http://www.ncsu.edu/odi/advance/>) (2009-2012)
- 4) College of Engineering Faculty Development & Special Initiatives Faculty Development Committee (2008-2016)
- 5) University Lifelong Faculty Involvement Committee (2015-2018)
- 6) College of Engineering Leadership Review Committee (2015-2016)
- 7) University Mentor Ring Program (2015-Present)
- 8) University Reappointment, Promotion, and Tenure Committee (2016-2018)
- 9) College of Engineering RPT Committee (2017-2020)

Civil, Construction, Environmental Department Committees:

- 1) WREE group coordinator (2004-2006)
- 2) Lab Equipment Committee (1999-2010)
- 3) ABET Subcommittee: Senior Design and Lab (2001-2004)
- 4) Engineering Open House (1998-1999)
- 5) Executive Committee Member (2005-2006)

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| 6) Awards committee member | (2005-2009) |
| 7) Seminar committee member | (2005-2007) |
| 8) ABET subcommittee member | (2005-2010) |
| 9) ABET ENE Coordinator | (2006-2012) |
| 10) ABET Design Committee Chair | (2013-2016) |
| 11) CCEE RPT committee (Chair, 2012-2016) | (2010-2017) |
| 12) CCEE Energy Cluster Search Committee member | (2015-2017) |
| 13) CCEE Diversity and Recruiting Committee (Chair) | (2016-present) |
7. Professional service off campus:
- | | |
|---|----------------|
| 1) External Advisory board CAEE Dept. NCA&T University | (2017-Present) |
| 2) AEESP Board of Directors (Elected by Peers) | (2017-Present) |
| 3) Member, International Association of Plumbing and Mechanical Officials (IAPMO) standards committee | (2016-Present) |
| 4) AEESP Environmental Engineering Program representative for CCEE | (2016-Present) |
| 5) AEESP Membership and Demographics Committee, (chair since 2016) | (2015-2017) |
| 6) Member, Exploris Middle School Educational Excellence Committee | (2014-2015) |
| 7) Member, EPA SAB Hydraulic Fracturing Advisory Panel | (2013-2016) |
| 8) IWA CFD Working Group | (2013-Present) |
| 9) Board Member, Chartered EPA Science Advisory Board | (2012-Present) |
| 10) Board Member, International UV Association | (2011-2018) |
| 11) Adhoc Member, EPA SAB Environmental Economics Advisory Committee | (2011-2012) |
| 12) Member, WEF FOG Collection Systems Committee | (2010-2012) |
| 13) Board Member, EPA Science Advisory Board Drinking Water Committee | (2009-2015) |
| 14) Board Member, EPA SAB Science Technology Awards Committee | (2009-2012) |
| 15) North Carolina House of Representative Offshore Energy Exploration Study Committee | (2009-2010) |
| 16) Board Member, North Carolina Fulbright Association (Treasurer) | (2008-Present) |
| 17) Editorial Board Member, Journal of Environment Engineering ASCE | (2007-2015) |
| 18) International Population Balance Modeling Organizing Committee | (2002-2009) |
| 19) International Population Balance Modeling Scientific Committee | (2002-2010) |

Scholarship In The Realms Of Faculty Responsibility

- A. Scholarly Accomplishments - Publications (original research articles and research review articles in peer-reviewed journals, research abstracts, books), invited and uninvited research presentations, appointments or election to study sections and editorial boards.

Journal publications (Peer-reviewed)

Published

- 1) Blaney, L., Perlinger, J.A., Bartelt-Hunt, S.L., Kandiah, R., Ducostem J.J., 2017, Another Grand Challenge – Diversity in Environmental Engineering, Environmental Engineering Science, (Accepted for Publication)

- 2) Hao, Z., Sun, M., Ducoste, J., Benson, C.H., Luettich, S., Castaldi, M., Barlaz, M.A., 2017, Heat Generation and Accumulation in Municipal Solid Waste Landfills, Environmental Science and Technology, DOI: 10.1021/acs.est.7b01844
- 3) He, X., de los Reyes III, Ducoste, J.J., 2017, A Critical Review of Fat, Oil, and Grease (FOG) in Sewer Collection Systems: Challenges and Control, Critical Reviews in Environmental Science and Technology, <http://dx.doi.org/10.1080/10643389.2017.1382282>
- 4) Wang JP, Tunlaya-Anukit S, Shi R, Yeh TF, Chuang L, Isik F, Yang C, Liu J, Li Q, Loziuk PL, Naik PP, Muddiman DC, Ducoste JJ, Williams CM, Sederoff RR, Chiang VL, 2017, A proteomic based quantitative analysis of the relationship between monolignol biosynthetic protein abundance and lignin content using transgenic *Populus trichocarpa* In: Quideau S & Yoshida K (eds) *Recent Advances in Polyphenol Research, Volume 5*
- 5) Karam, A., McMillan, C., Lai, Y., de los Reyes, F., Sederoff, H., Grunden, A., Ranjithan, R., Levis, J., Ducoste, J., 2017, Construction and Setup of a Bench Scale Algal Photosynthetic Bioreactor with Temperature, Light, pH Monitoring for Kinetic Growth Tests, Journal of Visual Experimentation, 124, DOI: doi:10.3791/55545, URL: <https://www.jove.com/video/55545>
- 6) Yousefelahiyeh, R., Dominic, C.C.S., Ducoste, J., 2017, Modeling Fats, Oil, and Grease Deposit Formation and Accumulation in Sewer Collection Systems, Journal of Hydroinformatics 19.3: 443-455.
- 7) Hao, Z., Malyala, D, Dean, L, Ducoste, J, 2017, Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy for determination of Long Chain Free Fatty Acid concentration in oily wastewater using the double wavenumber extrapolation technique, Talanta, (165), pp 526-532
- 8) Samstag, R.W., Ducoste, J. J., Griborio, A., Nopens, I., Batstone, D.J., Wicks, J.D., Saunders, S., Wicklein, E.A., Kenny, G., Laurent, J., 2016, CFD for Wastewater Treatment: An Overview, Water Science and Technology, 74(3), pp 549-563
- 9) Blaney, L., Kandiah, R., Ducoste, J., Perlinger, J., Bartelt-Hunt, S., 2016, Assessing the Growth and Demographics of Environmental Engineering from 2005-2013, Environmental Engineering Science, 33(8), pp 578-590
- 10) Xiong, J., Fu, D., Singh, R.P., Ducoste, J.J., 2016, Structural Characteristics and Development of the Cake Layer in a Dynamic Membrane Bioreactor, Journal Separation and Purification Technology, 167, pp 88-96
- 11) Iasmin, M., Dean, L., Ducoste, J., 2016, Quantifying Fat, Oil, and Grease Deposit Formation Kinetics, Water Research, 88(1), pp 786-795
- 12) Wicklein, E., Batstone, D., Ducoste, J., Laurent, J., Griborio, A., Wicks, J., Samstag, R., Saunders S., Potier, O., Nopens, I., 2016, Good Modeling Practice in Applying Computational Fluid Dynamics for WWTP Modeling, Water Science & Technology, 73(5), pp 969-982
- 13) Jenny, R., Jasper, M., Simmons, O.D., Shatolov, M., Ducoste, J., 2015, Heuristic Optimization of a Continuous Flow Point of Use UV-LED Disinfection Reactor using Computational Fluid Dynamics, Water Research, 83: 310-318

- 14) Koryachko, A., Matthiadis, A., Muhammad, D., Foret, J., Brady, S.M., Ducoste, J., Tuck, J., Long, T., Williams, C., 2015, Clustering and Differential Alignment Algorithm: Identification of Early Stage Regulators in the Arabidopsis thaliana Iron Deficiency Response, Plos one, Vol 3-4, pp 20-29
- 15) Koryachko, A., Matthiadis, A., Ducoste, J., Tuck, J., Long, T., Williams, C., 2015, Computational approaches to identify regulators of plant stress response using high-throughput gene expression data, Current Plant Biology, Vol 3-4, pp 20-29
- 16) Ducoste, J., Alpert, S., 2015, Computational Fluid Dynamics Modeling Alternatives for UV-Initiated Advanced Oxidation Processes, Water Quality Research Journal of Canada, 50(1), pp 4-20
- 17) Nopens, I., Torfs, E., Ducoste, J., Vanrolleghem, P., Gernaey, K., 2015, Population balance models: a useful complementary modelling framework for future WWTP modelling, Water Science & Technology, Vol 71 No 2 pp 159–167
- 18) Laurent, J., Samstag, R., Ducoste, J., Griborio, A., Nopens, I., Batstone, D., Wicks, J., Saunders S., Potier, O., 2014, A protocol for the use of computational fluid dynamics as a supportive tool for wastewater treatment plant modelling, Water Science & Technology, Vol 70 No 10 pp 1575–1584
- 19) Jenny, R., Simmons, O.D., Shatolov, M., Ducoste, J., 2014, Modeling a Continuous Flow Ultraviolet Light Emitting Diode Reactor using Computational Fluid Dynamics, Chemical Engineering Science, 116: 524-535
- 20) Fu, D., Singh, R.P., Kai, H., Ducoste, J.J., 2014, Enhanced Nitrogen Removal by Rice Husk Amended Dynamic Membrane Bioreactor, Journal of Env Eng ASCE, 140(11), DOI: 10.1061/(ASCE)EE.1943-7870.0000840
- 21) Chen, H., Song, J., Wang, J.P., Lin, Y., Ducoste, J., Shuford, C.M., Liu, J., Li, Q., Shi, R., Nepomuceno, A., Isik, F., Muddiman, D.C., Williams, C., Sederoff, R.R., Chiang, V.L., 2014, Systems Biology of Lignin Biosynthesis in *Populus trichocarpa*: Heteromeric 4-Coumaric Acid:Coenzyme A Ligase Protein Complex Formation, Regulation, and Numerical Modeling, Plant Cell, doi: <http://dx.doi.org/10.1105/tpc.113.119685>
- 22) Wang, J.P., Naik, P.P., Chen, H., Shi, R., Lin, C., Liu, J., Shuford, C.M., Li, Q., Sun, Y.H., Tunlaya-Anukit, S., Williams, C.M., Muddiman, D.C., Ducoste, J.J., Sederoff, R.R., Chiang, V.L., 2014, Complete Proteomic-Based Enzyme Reaction and Inhibition Kinetics Reveal How Monolignol Biosynthetic Enzyme Families Affect Metabolic Flux and Lignin in *Populus trichocarpa*, Plant Cell, doi: <http://dx.doi.org/10.1105/tpc.113.120881>
- 23) Iasmin, M., Dean, L., Lappi, S., Ducoste, J., 2014, Factors that influence the Properties of FOG deposit formation in sewer collection systems, Water Research, 49(1), pp 92-102
- 24) Dominic, C., Szakasits, M., Dean, L., Ducoste, J., 2013, Understanding the Spatial Formation and Accumulation of Fats, Oils, and Grease Deposits in the Sewer Collection System, Water Science and Technology, 68(8) pp 1830–1836
- 25) He, X., Iasmin, M., Dean, L., Lappi, S., de los Reyes, F.L., Ducoste, J., 2013, Mechanisms of Fat, Oil, and Grease Deposit Formation in Sewer Lines, Water Research, (47) 13, pp. 4451-4459

- 26) Chen, H.C., Song, J., Williams, C.M., Shuford, C.M., Liu, J., Wang, J.P., Li, Q., Shi, R., Gokce, E., Ducoste, J., Muddiman, D.C., Sederoff, R.R., Chiang, V.C., 2013, Monolignol Pathway 4-Coumaric Acid:Coenzyme A Ligases in *Populus trichocarpa*: Novel Specificity, Metabolic Regulation, and Simulation of Coenzyme A Ligation Fluxes, *Plant Physiology*, Vol. 161, pp. 1501-1516
- 27) Long, H., Aziz, T., de los Reyes, F. L., Ducoste, J., 2012, Anaerobic Co-Digestion of Fat, Oil, and Grease (FOG): A Review of Gas Production and Process Limitations, *Process Safety and Environmental Protection*, 90(3),pp. 231-245 (Top 5 most highly cited article)
- 28) Aziz, T., Keener, K., Holt, L., Groninger, J., Ducoste, J.J., 2012, Field Characterization Of Grease Abatement Devices, *Water Environment Research*, 84(3), 237-246
- 29) Olukanni, D., Ducoste, J., 2011, Optimization of Waste Stabilization Pond Design for Developing Nations using Computational Fluid Dynamics, *Journal of Ecological Engineering*, 37, pp. 1878-1888
- 30) He, X., Iasmin, M., Dean, L., Lappi, S., Ducoste, J., de los Reyes, F.L., 2011, Evidence for fat, oil and grease (FOG) deposit formation mechanisms in sewer lines, *Environmental Science and Technology*, 45(10):4385-91
- 31) Hubbe, M.A., Hasan, S.H., Ducoste, J.J., 2011, Cellulosic Substrates for Removal of Pollutants from Aqueous Systems: A Review 1. Metals, *Bioresources* 6(2), 2161-2287
- 32) Gallimore, E., Aziz, T., Mohvahed, Z., Ducoste, J., 2011 Assessment of Internal and External Grease Interceptor Performance for Removal of Food Based Fats, Oil, and Grease from Food Service Establishments, *Water Environment Research*, 83(9):882-92
- 33) Bowker C., Sain. A., Shatolov, M., and Ducoste. J., 2011, Microbial UV Fluence-Response Assessment using a Novel UV-LED Collimated Beam System, *Water Research*, 45(5), pp. 2011-2019
- 34) Vallabh, R., Ducoste, J., SECAM, A.F., Banks-Lee, P., 2011, Modeling Toruosity in Fibrous Porous Media using Computational Fluid Dynamics, *Journal of Porous Media*, 14(9), pp. 791-804
- 35) Aziz, T., Keener, K., Holt, L., Ducoste, J.J., 2011, Performance of Grease Abatement Devices for Removal of Fat, Oil, and Grease, *Journal of Environmental Engineering ASCE*, 137(1), pp. 84-92
- 36) Santoro, D., Raisee, M., Moghaddami, M., Ducoste, J., Sasges, M., Liberti, L., Notarnicola, M., 2010, Modeling Hydroxyl Radical Distribution and Tri-alkyl Phosphates Oxidation in UV-H₂O₂ Photoreactors using Computational Fluid Dynamics, *Environmental Science and Technology*, 44, pp 6233-6241
- 37) Alpert, S., Knappe, D., Ducoste, J.J., 2010, Modeling of UV/Hydrogen Peroxide Advanced Oxidation Processes using Computational Fluid Dynamics, *Water Research*, 44 (6), pp. 1797-1808
- 38) Zhao, Xi, Alpert, S., Ducoste, J., 2009, Assessing the Impact of Upstream Hydraulics on the Dose Distribution of UV Reactors using Fluorescence Microspheres and Computational Fluid Dynamics, *Environmental Engineering Science*, Vol 26, 5,pp. 947-959

- 39) Keener, K.K., Ducoste, J.J., Holt, L. M., 2008, Properties Influencing FOG Deposit Formation, Water Environment Research, 80(12):2241-6
- 40) Richards, B., Ducoste, J.J., 2008, Application of Non-Biological Surrogates for Analysis of Sequential Disinfection Continuous Flow systems, Journal of Water Supply and Research, AQUA, 57(4), pp 225-238
- 41) Liu, D., Ducoste, J.J., Wu, C., Linden, K.G., 2007, Numerical Simulation of UV Disinfection Reactors: Evaluation of Alternative Turbulence Models, Applied Mathematical Modeling, 31, pp. 1753-1769
- 42) Prat, O., Ducoste, J.J., 2007, Simulation of Flocculation in Stirred Vessels: Eulerian vs. Lagrangian Approaches, Trans IChemE, 85(A2): 207-219
- 43) Bohrerova Z., Mamane, H, J. Ducoste, K. G. Linden, 2006, Comparative inactivation of *Bacillus subtilis* spores and MS-2 coliphage in a UV reactor: implications for validation, Journal of Environmental Engineering ASCE, 132, pp 1554-1561
- 44) Mamane, H, Ducoste, J.J and Linden, K.G, 2006, Impact of Particles on UVC Light Penetration in Natural and Engineered Systems, Applied Optics, 45(8), 1844-1856
- 45) Prat, O.P., Ducoste, J.J., 2006, Modeling Spatial Distribution of Floc size in Turbulent Processes Using Quadrature Method of Moment and Computational Fluid Dynamics, Chemical Engineering Science, 61(1), pp. 75-86
- 46) Liu, Y., J.J., Ducoste, 2006, Impact of turbulent mixing on the CFD chloramine model performance, Environmental Engineering Science, 23(2), pp. 341-356
- 47) Bohrerova Z., G., Bohrer, S. Mohanraj, J. Ducoste, K. G. Linden, 2005, Experimental measurements of fluence distribution in a UV reactor using fluorescent dyed microspheres, Environmental Science and Technology, 39, pp. 8925-8930
- 48) Ducoste, J.J., Linden, K.G., Rojker, D., Liu, D., 2005, Assessment of Reduction Equivalent Fluence Bias Using Computational Fluid Dynamics, Environmental Engineering Science, 22 (5): 615-628
- 49) Liu, Y., Ducoste, J.J., 2005, Numerical Simulation of Chloramines Formation in Turbulent Flow using a Multi-Fluid Micromixing Model, Journal of Environmental Modeling and Software, 21(8), pp. 1198-1213
- 50) Ducoste, J.J., D. Liu, K. Linden, 2005, Alternative Approaches to Modeling Dose Distribution and Microbial Inactivation in Ultraviolet Reactors: Lagrangian vs Eulerian, Journal Environmental Engineering, ASCE, 131(10), pp 1393-1403.
- 51) Jin, S., K. Linden, J.J. Ducoste, D., Liu, 2005, Impact of Lamp Shadowing and Reflection on the Fluence Rate Distribution in a Multiple Low-Pressure UV Lamp Array, Water Research, 39, pp. 2711-2721
- 52) Ormeci, B., Ducoste, J.J., Linden, K.G., 2005, UV Disinfection of a Chlorinated Water: Impact on Chlorine concentration and UV Dose Delivery, Journal of Water Supply: Research & Technology –AQUA, 54(3), pp. 189-199
- 53) Ducoste, J.J. and K. Linden, 2005, Determination of UV Sensor Location for Sensor Set-point Monitoring using Computational Fluid Dynamics, Journal of Environmental Engineering and Science , 4(S1), pp. S33-S43

- 54) Liu, D., J.J. Ducoste, S. Jin, K. Linden, 2004, Evaluation of Alternative Fluence Rate Distribution Models, Journal Water Supply and Research-AQUA 53(6) pp 391-408.
- 55) Baeza, C. and J.J. Ducoste, 2004 A Non-Biological Surrogate for Sequential Disinfection Processes, Water Research, 38, pp 3400-3410.
- 56) Ortiz, V., J.J., Ducoste, 2004, Modeling Low Energy Mixers for Chemical Dispersion in Drinking Water Treatment, Environmental Engineering Science 21(2) 241-262
- 57) Hopkins, C., J.J. Ducoste, 2003, Characterizing Flocculation under Heterogeneous Turbulence, Journal of Colloid and Interface Science, (264), pp. 184-194.
- 58) Chaiprapat, S., J.J. Cheng, J.J. Classen, J.J. Ducoste, S.K. Liehr, 2003, Modeling Nitrogen Transport In Duckweed Pond For Secondary Treatment Of Swine Wastewater, Journal of Environmental Engineering ASCE, Vol. 129, No. 8, pp. 731-739.
- 59) Peplinski, D, J.J. Ducoste, 2002, Modeling Disinfection Contactor Hydraulics Under Uncertainty, Journal of Environmental Engineering ASCE, 128 (11), pp. 1056-1067.
- 60) Ducoste, J.J., 2002, A Two-Scale PBM for Modeling Turbulent Flocculation in Water Treatment Processes, Chemical Engineering Science, Vol. 57, No. 12, pp. 2157-2168.
- 61) Ducoste, J.J., Carlson, K., Bellamy, W., 2001, The Integrated Disinfection Design Framework Approach to Reactor Hydraulics Characterization, Journal of Water Supply: Research and Technology-AQUA, 50(4) pp 245-261.
- 62) Doby, T. A., D. H. Loughlin, F. L. de los Reyes III, and J. J. Ducoste, 2001, Optimization of Activated Sludge Designs Using a Genetic Algorithm, Water Science and Technology, Vol. 45, No. 6, pp 187-198.
- 63) Bellamy, W., Carlson, K., Pier, D., Ducoste, J., Carlson, M., 2000, Determining Disinfection Needs, Journal American Water Works Association, Vol. 92, No. 5, pg. 44-52.
- 64) Ducoste, J.J. and Clark, M.M. 1999, Turbulence in Flocculators: Comparison Between CFD Simulations and LDV Experiments, AIChE J, Vol. 45, No. 2, pp. 432-436.
- 65) Ducoste, J.J. and Clark, M.M. 1998, The Influence of Tank Size and Impeller Geometry on Turbulent Flocculation: I Experimental, Environmental Engineering Science, Vol. 15, No. 3, pp. 215-224.
- 66) Ducoste, J.J. and Clark, M.M. 1998, The Influence of Tank Size and Impeller Geometry on Turbulent Flocculation: II Model, Environmental Engineering Science, Vol. 15, No. 3, pp. 225-235.
- 67) Ducoste, J.J., Clark, M.M., Weetman, R.J. 1997, Turbulence Measurements in Flocculators: Effects of Tank Size & Impeller Type, AIChE J, Vol. 43, No. 2, pp. 328-338.

Editorial (Peer Reviewed)

- 1) Nopens, I., Brisen, H., Ducoste, J., 2009, Celebrating a Milestone in Population Balance Modeling, Chemical Engineering Science, 64, pg 627

Special Editor (Peer-reviewed)

- 1) Nopens, I., Ducoste, J.J., Briesen, H., 2009, Advances in Population Balance Modeling, Chemical Engineering Science, 64

Technical Reports (Peer-reviewed) Final reports to the American Water Works Association Research Foundation undergo a rigorous two-stage peer review by a project advisory committee comprised of three to four members from academia and environmental engineering practice. Reports are published by AWWARF and are the principal product for AWWARF subscribers (900 utilities in the US, Canada, United Kingdom, Germany, France, Australia, and Brazil as well as 43 consulting firms and 11 manufacturers).

Published

- 1) Ducoste, J.J., Knappe, D., Alpert, S., 2010, Evaluation of Computational Fluid Dynamics (CFD) for Modeling UV Initiated Advance Oxidation Processes, Water Research Foundation, Denver, CO.
- 2) Ducoste, J.J., Keener, K., Groninger, J., Holt, L., 2008, Fats, Roots, Oil, and Grease (FROG) in Centralized and Decentralized Systems: Characterization FOG Deposits and Root Control, Water Environment Research Foundation, Alexandria, VA.
- 3) Ducoste, J.J., Keener, K., Groninger, J., Holt, L., 2008, Assessment of Grease Interceptor Performance, Water Environment Research Foundation, Alexandria, VA.
- 4) Ducoste, J.J., Keener, K., Groninger, J., Holt, L., 2008, FOG Interceptor Design and Operation (FOGIDO) Guidance Manual, Water Environment Research Foundation, Alexandria, VA.
- 5) Hulsey, R., Linden, K.G., Ducoste, J.J., 2007, UV Disinfection for Large Water Treatment Plants, American Water Works Association Research Foundation, Denver, CO.
- 6) Ducoste, J.J. and K.G., Linden, 2006, Hydrodynamic Characterization of UV Reactors, American Water Works Association Research Foundation, Denver, CO.
- 7) Crozes, G., Hagstrom, J.P., Clark, M.M., Ducoste, J.J., Burns, C. 1998, Improving Clearwell Design for CT Compliance, American Water Works Association Research Foundation, Denver, CO.
- 8) Carlson, K.H., Bellamy, W., Ducoste, J., Amy, G., 2001, Implementation of the Integrated Disinfection Design Framework, American Water Works Association Research Foundation, Denver, CO.

Conference Proceedings Book (Peer-reviewed) (The full conference papers are reviewed by a panel of experts with an acceptance rate of 50%)

- 1) Nopens, I., K., Malise, C., Biggs, J.J., Ducoste, 2004, Advances in Population Balance Modeling, Eurosis, Ghent, Belgium

Conference Proceedings (Peer-reviewed) (The full conference papers are reviewed by a panel of experts with an acceptance rate of 50%)

- 1) Ducoste*, J.J., Malmrose, P., Weil, G., Beacham, T., 1999, Determining Design Criteria for New WTP Solids Handling Facility, AWWA/WEF Residuals and

Biosolids conference, Charlotte, NC.

Journal publications (Non-Peer-reviewed)

- 1) Bowker, C., Alpert, S., Shatalov, M., Ducoste, J., 2012, UV LEDs for Water Disinfection, International Ultraviolet Association News
- 2) Ducoste, J.J., 2009, Computational Fluid Dynamics as an Integral Part of Water and Wastewater Treatment Process Design, Influent: Water Environment Association of Ontario, Volume 4, pp 40-44
- 3) Ducoste, J.J., Wood, J., Aziz, T., Groninger, J., Holt, L., Keener, K., 2008, Rooting out SSOs: Evaluating Popular Root Control Methods in a Pilot Sanitary Sewer, Water Environment Technology, Vol. 20, No. 6 pp 56-60

Conference Proceedings (Other) (* = Presenter)

- 1) *Hao, Z., Sun, M., Ducoste, J., Barlaz, M., 2017, A Model to Describe Heat Generation and Accumulation at Municipal Solid Waste Landfills, Geotechnical Frontiers Conference Orlando, FL, March 12-15
- 2) *Weaver, J.E., Ducoste, J.J., de los Reyes, F.L., 2016, Inducing Aerobic Granular Sludge Formation Through Unevenly Distributed Hydrodynamic Shear Rates, NCAWWA-WEA, Raleigh, NC, Nov. 13-16
- 3) *Hao, Z., Malyala, D, Ducoste, J, 2016, Determination of Long Chain Free Fatty Acid (LCFFA) in Wastewater Using a Novel Double Wavenumber FTIR Technique for the Protection of Sanitary Sewer Collection Systems, NCAWWA-WEA, Raleigh, NC, Nov. 13-16
- 4) *Malyala, D, Hao, Z., Ducoste, J, 2016, Determining the fate of Long Chain Free Fatty Acids and Fats, Oils and Grease in Sewer Collection Systems using a double waveband FTIR technique, NCAWWA-WEA, Raleigh, NC, Nov. 13-16
- 5) *Weaver, J.E., Ducoste, J.J., de los Reyes, F.L., 2016, Fluid Shear Variation Potentially Plays a Role in Aerobic Granular Sludge Formation, WEFTEC, New Orleans, LA, Sept 24-28
- 6) Karam, A., de los Reyes, F.L., Levis, J., Ranjithan, R. and Ducoste, J., 2016, Photochemical Micro-sensors for Evaluating Light Distribution within Photosynthetic Bioreactors for Biofuels Production, 6th International Conference on Algal Biomass and Bioproducts. San Diego, CA. June 26-29
- 7) Vallabh, R., Seyam, A., Banks-Lee, P., Ducoste, J., 2015, Pore Channel Tortuosity in 3D Nonwoven Structures, 6th World Conference on 3D Fabrics and their Applications, Raleigh, NC, USA, May 26-28, 2015
- 8) Wang, L., Hossen, E.H., Aziz, T.N., Ducoste, J., de los Reyes, F.L., 2015, Directing Microbial Community Assembly by Deterministic Niche Differentiation in Anaerobic Digesters, WEFTEC, Chicago, IL, Sept 26-30, CDROM
- 9) *Manavi, R., de los Reyes, F.L., Levis, J., Ranjithan, R. and Ducoste, J., 2015, Coupling fluid dynamics with kinetic modeling to quantify the effects of photosynthetic bioreactor

- design and operation on yield performance, 249th ACS National Meeting. Denver, CO. March 22-26,
- 10) *Jenny, R., Ducoste, J., 2014, Challenges in Designing a UV LED Reactor for Disinfection: Why CFD Should be your Best Friend, AWWA WQTC New Orleans Nov 16-20, CDROM
 - 11) *Jenny, R., Ducoste, J., 2014, Computational Fluid Dynamics Optimization of a Continuous Flow Point of Use UV LED Disinfection Reactor, IUVA Regional Conference White Plains NY Oct 26-28
 - 12) Olukanni, D.O., Ducoste, J., George, T.O., 2014, Creating Water, Sanitation, and Hygiene (WASH) Program Awareness in Schools: A tool Towards the Success of Community WASH Programs, EDULEARN14, Barcelona Spain July 7-9
 - 13) *Wang, L., Hossen, E.H., Aziz, T.N., Ducoste, J., Bullard, M., de los Reyes, F.L., 2014, Pulse Feeding Of Anaerobic Digesters Treating Grease Waste To Increase Community Resistance, IWA World Water Congress & Exhibition, Lisbon Portugal, Sept 21-26, CDROM
 - 14) Nopens, I., Torfs, E., Ducoste, J., Vanrolleghem, P., Gernaey, K., 2014, PBMs: A Modeling Framework for WWTP Modeling, IWA/WEF WWT MOD SPA, Belgium, CDROM, March 30-April 2
 - 15) Samstag, R., Ducoste, J., Gribrio, A., Nopens, I., Batstone, D., Wicks, J., Saunders, S., Laurent, J., Potier, O., 2014, CFD as a tool for WWTP Unit Process Modeling, IWA/WEF WWT MOD SPA, Belgium, CDROM, March 30-April 2
 - 16) *Iasmin, M., Ducoste, J., 2014, Effect of Source and Environmental Factors on Properties and Kinetics of FOG Deposits in Sewer Collection Systems, WEF Collection System, Baltimore, MD, March 12-14, CDROM
 - 17) *Yousefelahiyeh, R., Dominic, C.C.S., Ducoste, J., 2014, FOGISEW: Modeling FOG Deposit Formation in Sewer Collection System, WEF Collection System, Baltimore, MD, March 12-14, CDROM
 - 18) *Wang, L., Hossen, E.H., Aziz, T.N., Ducoste, J., Bullard, M., de los Reyes, F.L., 2013, Developing Resistant and Resilient Anaerobic Co-Digesting Microbial Communities, WEFTEC, Chicago, IL, Oct 5-9, CDROM
 - 19) *Yousefelahiyeh, R., Dominic, C.C.S., Ducoste, J., 2013, A Numerical Method to Simulate the Formation of Fats, Oils, and Grease (FOG) Deposits in a Sewer Collection System, WEFTEC, Chicago, IL, Oct 5-9, CDROM
 - 20) *Iasmin, M., Ducoste, J., 2013, Quantifying Fat, Oil, and Grease (FOG) Deposits Formation Kinetics in Sewer Collection System, NCAWWA/WEA, Concord, NC, November 10-13, CDROM
 - 21) *Yousefelahiyeh, R., Dominic, C.C.S., Ducoste, J., 2013, Simulating the Formation of Fats, Oils, and Grease (FOG) Deposits in a Sewer Collection System, NCAWWA/WEA, Concord, NC, November 10-13, CDROM
 - 22) *Jenny, R.M., Simmons, O.D., Ducoste, J., 2013, Experimental and Numerical Evaluation of a UV-LED Point of Use Disinfection Device, NCAWWA/WEA, Concord, NC, November 10-13, CDROM
 - 23) *Wang, L, Aziz, T.N., Ducoste, J.J., de los Reyes, III, F.L., 2012, Anaerobic Co-Digestion of Grease Trap Waste, WEFTEC 2012 New Orleans, LA., Sept 29-Oct 3

- 24) *Aziz, T.N., Long, J.H., Ducoste,J.J., 2012, Life Cycle Assessment of Grease Trap Waste Co-Digestion, Land Application, and Composting, Residual and Biosolids Management Session Speaker - WEFTEC 2012 New Orleans, LA., Sept 29-Oct 3
- 25) *Arafin, M., Ducoste, J., 2011, Modeling of a Flow Through UV LED Reactor using Computational Fluid Dynamics, NCAWWA/WEA, Concord, NC, November 13-16, CDROM
- 26) *Ducoste, J. J. and Alpert 2011, Assessing the UV Dose Delivered from Two UV Reactors in Series: Can you always assume doubling the UV dose from individual reactor validations?, IUVA, SEPT 18-20, Toronto, ONT, CDROM
- 27) *Alpert S., Bowker, C. & Ducoste, J. J., 2011, UV-LEDs for Water Disinfection – Are We Close?, IUVA, SEPT 18-20, Toronto, ONT, CDROM
- 28) *Bowker, C. & Ducoste, J. J., 2011, Evaluation of UV LEDs for Point of Use Disinfection Processes, AWWA Conference Washington DC, June 12-16, CDROM
- 29) Sobremisana, A., de los Reyes, F., Ducoste, J., 2011, Combined CFD, Floc Aggregation, and Microbial Growth Kinetics Modeling for Carbon and Nitrogen Removal, WEFTEC, Los Angeles, CA, Oct 16-19, CDROM
- 30) *Vallabh, R., Seyam, A.M., Banks-Lee, and Ducoste, J., 2010, Tortuosity in Fibrous Porous Media, Proceedings of the 7th International Conference of Textile Research Division, National Research Center, Cairo, Egypt, October 10-12, CDROM
- 31) *Aziz, T.N., Holt, L., Keener, K., Ducoste, J.J., 2010, Assessment of Field Grease Abatement Devices, WEFTEC, New Orleans, LA, Oct 10-13, CDROM
- 32) *Gallimore, Aziz, Ducoste, 2010, Assessment of Grease Abatement Systems, WEF Sewer Collection System Conference, Phoenix, AZ, June 7-10, CDROM
- 33) *Alpert, S.M., Jin, S., Aziz, T., Ducoste, J., 2010, The Value of Numerical Modeling in the Design and Operation of Drinking Water Treatment Processes, AWWA National Conference Chicago IL, June 20-24, CDROM
- 34) *Alpert, S. M., & Ducoste, J. J., 2009, A CFD Modeling Protocol for Simulating the UV/H₂O₂ Advanced Oxidation Process, AWWA Water Quality and Technology Conference, Seattle, WA.
- 35) *H. Hong, J.C. Williams, J. Hsieh, J. Ducoste, and F.L. de los Reyes III, 2008, Monitoring Microbial Shifts During Activated Sludge Floc and Aerobic Granule Development, 81th Water Environment Federation Annual Conference and Exposition (WEFTEC 2008), October 21-25, Chicago, IL, CDROM
- 36) Hyunsuk H, J.C. Williams, J. Hsieh, J. Ducoste, *F. L. de los Reyes, 2008, Floc Size Control and Microbial Shifts during Aerobic Flocculation in Couette-Taylor Bioreactors, International Water Association Leading edge conference, June 1-4, Zurich, Switzerland, CDROM
- 37) *Zhao, X., Ducoste, J., 2008, Analysis Of A Low Pressure UV Reactor Under Multiple Upstream Elbow Configurations Using UV Sensitive Fluorescent Microspheres, American Water Works Association National Conference, Atlanta, GA, June 8-12, CDROM
- 38) *Aziz, T., Holt, L., Keener, K., Ducoste, J., 2007, Field Observations of Grease Interceptor Performance, Water Environment Federation Workshop, Raleigh, NC, 4-5, CDROM

- 39) *Aziz, T., Holt, L., Keener, K., Ducoste, J., 2007, Experimental and Numerical Analysis of Grease Interceptor Performance, NCAWWA/WEA, Greensboro, NC, December 3-5, CDROM
- 40) *Wood, J., Aziz, T., Groninger, J., Holt, L., Keener, K., Ducoste, J., 2007, Observation and Analysis of Popular Root Control Methods in Pilot Scale Sanitary Sewer, Water Environment Federation Technology Conference, San Diego, CA, October 15-17, CDROM
- 41) Richards, B., *Ducoste, J., 2007, Evaluating Sequential Disinfection in Continuous Flow Water Treatment Systems, American Water Works Association Water Quality Technology Conference, Charlotte, NC, November 4-8, CDROM
- 42) *Alpert, S., Ducoste, J., 2007, Modeling Organics Degradation with the UV/H₂O₂ Advanced Oxidation Process Using Computational Fluid Dynamics, American Water Works Association Water Quality Technology Conference, Charlotte, NC, November 4-8, CDROM
- 43) *Alpert, S., Knappe, D., Ducoste, J., 2007, The Use of Computational Fluid Dynamics (CFD) to Model UV-Initiated Advanced Oxidation Processes, International Ozone Association - International Ultraviolet Association World Congress, Los Angeles, CA August 27-30, CDROM
- 44) *Alpert, S., Knappe, D., Ducoste, J.J., 2007, Incorporation of Micromixing models within CFD Simulations of UV Advanced Oxidation Processes, American Water Works Association National Conference, Toronto, Canada, June 4-8, CD-ROM
- 45) *Bohrerova, Z., H, G.I., Bohrerova, Mohanraj, M., Ducoste, J.J and Linden, K.G, 2005, Experimental Measurements of Fluence distribution in a UV Reactor using Fluorescent Microspheres, Proceedings American Water Works Association Water Quality Technology Conference, Quebec City, Quebec. CD-ROM
- 46) *Mamane-Gravetz, H, Ducoste, J.J and Linden, K.G, 2005, Impact of Particles on UVC Light Penetration in Natural and Engineered Systems, Proceedings International Ultraviolet Association Conference, Whistler, British Columbia, May 24-27, 10 pgs
- 47) *Ducoste J.J., , D., Liu, K.G., Linden, Zuzana, H., Mamane-Gravetz, 2005, Impact of Influent Pipe Configuration on UV Reactor Performance: Is the Elbow Truly the Worst Case Hydraulic Condition, Proceedings WEF Disinfection Conference, Phoenix, AZ, February 6-9
- 48) *Ducoste, J.J., K.G., Linden, D., Rokjer, 2004, Numerical Prediction of the Reduction Equivalent Fluence Bias, Proceedings AWWA Water Quality Technology Conference, San Antonio, TX, November 14-18
- 49) *Ducoste, J.J. and Y., Liu, 2004, Numerical Prediction of Mixing Performance for Chloramines Formation , Proceedings AWWA Water Quality Technology Conference, San Antonio, TX, November 14-18
- 50) *Prat, O., Ducoste, J.J., 2004, Modeling Spatial Distribution of Floc size in Turbulent Processes Using Quadrature Method of Moment and Computational Fluid Dynamics. 2nd International Conference on Population Balance Modeling, Valencia, Spain, May 5-7
- 51) *Richards, B.H., C, Baeza, J. Ducoste, 2004, Assessing Sequential Disinfection Performance in a Flow Through System Using a Non-Biological Surrogate, Proceedings, AWWA Research Symposium in Baltimore, Maryland, April 18-20,

- 52) *Liu, Y., J. Ducoste, 2003, Using CFD Model to Analyze Mixing Performance for the Formation of Chloramines, Proceedings NC AWWA/WEF Annual Conference, Greensboro, NC, November 17-20, 12 pgs.
- 53) *Baeza, C., B.H. Richards, J. Ducoste, 2003, Evaluation Of Sequential Disinfection Strategy in Drinking Water Treatment using a Non-Biological Surrogate, NC AWWA/WEF Annual Conference, Greensboro, NC, November 17-20, 12 pgs.
- 54) *Rokjer, D., M. Valade, D. Keesler, M. Borsykowsky, J. Ducoste, 2003, Medium Pressure UV Reactor Models for Validation Purposes, Proceedings AWWA Water Quality and Technology Conference, Philadelphia, PA, 22 pgs.
- 55) *Hulsey, R., H. Mackey, J. Neemann, K. Linden, J. Ducoste, 2003, Implementing UV into Large Water Treatment Plants, Proceedings International Ultraviolet Association Conference, Vienna, Austria, July 9-11., 10 pgs
- 56) *Ducoste, J.J., D. Liu, J. Shanshan, K.G. Linden, 2003, Evaluation of UV Fluence Rate Distribution Models, Proceedings International Ultraviolet Association Conference, Vienna, Austria, July 9-11., 10 pgs
- 57) *Jin, S., J.J. Ducoste, K.G. Linden, 2002, Determination of fluence rate distribution in UV reactors using spherical actinometry and mathematical analysis approaches, Proceedings American Water Works Association WQTC Conference, Seattle, WA, November 10-14., 15 pgs
- 58) *Hopkins, C., J.J. Ducoste, 2002, Characterizing The Spatial Variation In Particle Aggregation Due To Heterogeneous Turbulence In A Flocculation Reactor, NC AWWA/WEF Annual Conference, Winston-Salem, NC, November 17-20, 12 pgs.
- 59) *Ducoste, J.J., D. Liu, K. Linden, 2002, Modeling Drinking Water UV Disinfection Reactors using PHOENICS: Comparison between Eulerian and Lagrangian Approach, Proceedings, Phoenix User Conference, Moscow, Russia, September 21-28, 15 pgs.
- 60) Ortiz, V. and J.J. *Ducoste, 2002, Characterization of Drinking Water Treatment Chemical Mixing Performance using CFD, Proceedings Joint CSCE/EWRI of ASCE International Conference, Niagara Falls , Ontario , Canada July 21 – 24, 15 pgs.
- 61) *Ducoste, J.J. and K. Linden, 2002, An Alternative Approach to Determining Dose Distribution and Microbial Inactivation in UV Reactors using Computational Fluid Dynamics (CFD), Proceedings American Water Works Association National Conference, New Orleans, LA, June 17-21, 20 pgs.
- 62) *Doby, T., D. Loughlin, F. de los Reyes, J. J. Ducoste, 2002, Use of Design Scenarios and Chance-Constrained Genetic Algorithm for Wastewater Treatment Plant Design, Environmental & Water Resources Systems, Analysis (EWRSA) Symposium, in conjunction with the Water EWRI Conference, Roanoke, Virginia, USA, on May 19-22, 20 pgs.
- 63) Doby, T., D. *Loughlin, J. Ducoste, and F. L. de los Reyes III 2001, System-Wide Optimization of Wastewater Treatment Unit Processes Using a Distributed Genetic Algorithm, Environmental and Water Resources Institute/ASCE World Water and Environmental Resources Congress, May 20-24, Orlando FL. 15 pgs.
- 64) *Peplinski, D. and Ducoste, J.J., 2001, Lessons for Applying Computational Fluid Dynamics Modeling to Disinfection Clearwells, Environmental and Water Resources Institute/ASCE World Water and Environmental Resources Congress, May 20-24, Orlando FL, 10 pgs.

- 65) *Terry, S.D. and Ducoste, J.J., 2000, Modeling density current events in drinking water sedimentation processes using CFD, Proceedings NCAWWA/WEA Conference, Charlotte, NC, 10 pgs.
- 66) *Ducoste, J.J. Carlson, K., Bellamy, W., Carlson, M., 1999, A Systematic Approach to Reactor Hydraulic Characterization: Part 1 of the Integrated Disinfection Design Framework Protocol, Proceedings AWWA Water Quality and Technology Conference, Tampa, FL., 10 pgs.
- 67) *Ducoste, J.J., Daigger, G.T., Smith, R., 1999, Evaluation of Stacked Secondary Clarifier Design using Computational Fluid Dynamics, Proceedings Water Environment Federation Technology Conference, New Orleans, LA., 10 pgs.
- 68) *Peplinski, D. and Ducoste, J.J., 1999, Enhancement of Computational Fluid dynamics (CFD) Modeling of Clearwell Performance, Proceedings NCAWWA/WEA Conference, Asheville, NC., 10 pgs.
- 69) *Ducoste, J.J. and Brauer, R., 1999, Computational Fluid Dynamics Model of WTP Clearwell: Evaluation of Critical Parameters Influencing Model Performance, Proceedings, ASCE-CSCE Environmental Engineering Conference, Norfolk, VA., 10 pgs.
- 70) *Carlson, K.H., Bellamy, W., Pier, D., Ducoste, J., Carlson, M., 1999, Implementation of the Integrated Disinfection Design Framework, Proceedings American Water Works Association National Conference, Chicago, IL., 10 pgs.
- 71) *Ducoste, J.J. and Clark, M.M. 1997, The Influence of Tank Size and Impeller Type on Flocculation, Proceedings of the American Water Works Association National Conference, Atlanta, Georgia., 10 pgs.
- 72) *Hagstrom, J.P., Crozes, G., Reddy, S., Verghes, V., Clark, M.M., Ducoste, J.J., Burns, C. 1997, The Use of Computational Fluid Dynamics for Improving Clearwell Design for CT Compliance, Proceedings of the American Water Works Association Computer Conference, Austin, Texas., 10 pgs.
- 73) *Crozes, G., Hagstrom, J.P., Clark, M.M., Ducoste, J.J., Hermanowicz, S.W., Huntamer, J., 1996, Hydraulic Modeling for Improved CT Contactor Design, Proceedings of the American Water Works Association Annual Conference, Toronto, Ontario, 10 pgs.
- 74) *Clark, M.M. and Ducoste, J.J. 1996, A Journey in Understanding Mixing and Flocculation, Proceedings of the American Water Works Association Virginia Section, Williamsburg, Virginia., 1 pg.
- 75) *Ducoste, J.J., Clark, M.M., Weetman, R.J., 1995, The Evaluation of the Fluid Mechanics Generated in the Flocculation Process: Effects of Tank Size and Impeller Type, Proceedings of the American Water Works Association National Conference, Anaheim, California, 10 pgs.

Invited Presentations (No Paper)

- 1) Ducoste, J.J., 2017, Holy Dish Pan Hands Batman, there are Soaps in the Sewers: Fats, Oil, and Grease Issues in Sewer Systems, Seminar at University of South Florida, Tampa, FL
- 2) Ducoste, J.J., 2016, Grease Removal Devices: Challenges in the Removal of FOG Emulsions and the Impact of Food Service Establishment Operations, 32 Annual Onsite Water Protection Conference, Raleigh, NC

- 3) Ducoste, J.J., 2016, Game Changer: A New Technique for Measuring the Performance of Grease Interceptors, CMOM Conference, Austin, TX
- 4) Ducoste, J.J., 2016, Drinking Water Treatment: What Happens from Source to Tap, Durham Technical Community College, Durham NC
- 5) Ducoste, J.J., 2015, Internal and External Grease Interceptors: Challenges in the Removal of FOG Emulsions and the Impact of Food Service Establishment Kitchen Operations, Keynote Speaker, FOG New Times New Solutions Conference Cranfield University UK
- 6) Ducoste, J.J., 2015, How Restaurant Kitchen Practices Influence FOG Deposit Formation in Sewer Collection Systems, Invited Presentation, CMOM Conference, Austin, TX
- 7) Ducoste, J.J., 2014, Evaluation of Alternative Herbicides for Root Control: Should we be worried about their impact on Wastewater Treatment Plants?, Invited Presentation, CMOM Conference, Austin, TX
- 8) Ducoste, J.J., 2014, Data and CFD to Compare Horizontal and Vertical/enclosed UV Reactors, IUVA Specialty Conference UV Disinfection for Wastewater and Reuse Program, Irvine, CA
- 9) Ducoste, J.J., 2013, New Tools to Assess the Potential Risk of FOG deposit Accumulation in a Wastewater Collection System, Invited Presentation, CMOM Conference, Austin, TX
- 10) Ducoste, J.J., 2012, Modeling the removal of EDC chemicals using Advance Oxidation, WEFTEC, New Orleans, LA
- 11) Ducoste, J.J., 2012, Fat, Oil, and Grease (FOG) in Sanitary Sewer Systems: Factors that influence Deposit formation, Invited Presentation at NC Annual Onsite Water Protection Conference, Raleigh NC
- 12) Ducoste, J.J., 2012, Chemical and Hydraulic Factors that influence the formation of FOG Deposits in Sewer Collection Systems, Invited Presentation, CMOM Conference, Austin, TX
- 13) Ducoste, J.J., 2012, Modeling Advance Oxidation Processes for Optimizing Reactor Performance, Invited Presentation, IUVA Conference, Washington, DC
- 14) Ducoste, J.J., 2012, Numerical Approach to Modeling UV Disinfection Processes: A State of the Art Review, Southeast University, Nanjing, PR China
- 15) Ducoste, J.J., 2012, Using Computational Fluid Dynamics Modeling to guide design decisions, AWWA UVCFD Presentation Sue Bach Email, Dallas, TX, June 10-14
- 16) Ducoste, J.J., 2011, Fat, Roots, Oil, and Grease (FROG) in Sanitary Sewer Systems: Is a Sustainable Sewer system in Jeopardy, Invited Presentation at NC Annual Onsite Water Protection Conference, Raleigh NC

- 17) Ducoste, J.J., 2011, Velocity Profiles and their Relevance in UV Reactor Validation, IUVA workshop, Tracy CA,
- 18) Ducoste, J.J., 2010, Fat, Roots, Oil, and Grease (FROG) in Sanitary Sewer Systems: Is a Sustainable Sewer system in Jeopardy, Invited Presentation at NC Annual Onsite Water Protection Conference, Raleigh NC
- 19) Ducoste, J.J., 2010, Can CFD Answer Hydraulic Questions and make Validation more broadly applicable?, Invited Presentation at AWWA Nation Conference Workshop: UV Today – Ten Years Post-*Cryptosporidium*– Myths and Reality
- 20) Ducoste, J.J., 2010, Fats Roots Oil and Grease in US Sewer Systems: An overview, Invited Presentation at FOGS Buildup and Removal: Problems and Solutions Workshop Cranfield University, UK
- 21) Ducoste, J.J., 2010, Simulating the UV/H₂O₂ Advanced Oxidation Process using Computational Fluid Dynamics, Invited Presentation, Rensselaer Polytechnic Institute, Troy, NY
- 22) Ducoste, J.J., 2010, Grease Interceptors vs Under the Sink Grease Traps: Who won the Taste Test of Removing influent Fats, Oils, and Grease, Invited Presentation, CMOM Conference, Austin, TX
- 23) Ducoste, J.J., 2009, Assessment of Root Control Methods and Root Regrowth in a Pilot Scale Sanitary Sewer, Invited Presentation, CMOM Conference, Austin, TX
- 24) Ducoste, J.J., 2009, Analysis of Field Grease Interceptors, Invited Presentation, CMOM Conference, Austin, TX
- 25) Ducoste, J.J., 2009, The Intricacies of Analyzing/Designing Ultraviolet UV Disinfection Reactors using CFD, Invited Presentation, Water Reuse Workshop, Polytechnic University at Bari, Taranto, Italy
- 26) Ducoste, J.J., 2009, Population Balance Modeling in CFD Simulations, Invited Presentation, Water Reuse Workshop, Polytechnic University at Bari, Taranto, Italy
- 27) Ducoste, J.J., 2009, Computational Fluid Dynamics Modeling for Unit Process simulations in Drinking Water Treatment, Invited Presentation, Water Reuse Workshop, Polytechnic University at Bari, Taranto, Italy
- 28) Ducoste, J.J., 2009, Analysis of Fat, Oil, and Grease (FOG) in Sanitary Sewer Systems: Challenges to a Sustainable system, Invited Presentation, Villanova University, Villanova, PA
- 29) Ducoste, J.J., 2009, CFD Modeling for UV Disinfection and UV-Initiated Advanced Oxidation Processes, Invited Presentation, Disinfection 2009, Atlanta, GA
- 30) Ducoste, J.J., 2009, Simulating Ultraviolet Advance Oxidation Processes in Continuous Flow UV Reactors, Invited Presentation, University of Michigan, Ann Arbor, MI

- 31) Ducoste, J.J., 2008, Analysis of FOG and Roots in Sewer Collection systems, Invited Presentation, Water Environment Research Foundation Forum, Clearwater Beach, FL
- 32) Ducoste, J.J., 2008, Analysis and Design of Grease Interceptors, Invited Presentation, Water Environment Technology Conference, Workshop 115, Chicago, IL
- 33) Ducoste, J.J., 2008, FAT, Roots, Oil, and Grease (FROG) in Sanitary Sewers: Results from a Recent WERF Sponsored Study, Invited Presentation, Water Environment Research Foundation Webinar
- 34) Ducoste, J.J., 2008, An Introduction to Population Balance Modeling, Invited Presentation, MBR Training Seminar, Ghent University, Belgium
- 35) Ducoste, J.J., 2008, An Overview of Computational Fluid Dynamics Modeling, Invited Presentation, MBR Training Seminar, Ghent University, Belgium
- 36) Ducoste, J.J., 2008, Some Thoughts on CFD Modeling for Membrane Bioreactor Processes, Invited Presentation, 2nd Workshop CFD Modeling for MBR Applications, Ghent University, Belgium
- 37) Ducoste, J.J., 2008, Analysis of FAT, Roots, Oil, and Grease (FROG) in Sanitary Sewers, Invited Presentation, CMOM Conference, Austin, TX
- 38) Ducoste, J.J., 2008, Modeling UV reactors in Drinking Water Systems, Invited Presentation, Chemical Engineering Department, Mississippi State University
- 39) Ducoste, J.J., 2008, Analysis of Grease Interceptors for the Removal of FAT, Oil, and Grease (FOG): Are they Sufficient to Stop FOG related Sanitary Sewer Overflows, Invited Presentation, Civil and Environmental Engineering Department, Arizona State University
- 40) Ducoste, J.J., 2008, Analysis of Fat, Oil, and Grease Deposits in Sanitary Sewer Systems, Invited Presentation at Borchardt Conference, University of Michigan, Ann Arbor, MI
- 41) Ducoste, J.J., 2006, Modeling the Regulatory Behavior of *E coli* in Heterogeneous Substrate Environment, University of Ghent, Belgium, Biomath Department
- 42) Ducoste, J.J., 2006, Modeling Flocculation in Secondary Clarifiers using Quadrature Method of Moments, Water Environment Federation Technology (Weftec) Workshop, Dallas, Texas.
- 43) Ducoste, J.J., 2006, The Impact of Upstream turbulence characteristics on Ultraviolet (UV) Disinfection Reactors Performance, Invited Presentation at Purdue University, Department of Chemical Engineering
- 44) Ducoste, J.J., 2005, The Intricacies of Designing Ultraviolet (UV) Disinfection Reactors using Numerical Models, Invited Presentation at ATLANTIUM LTD, Har Tuv, Israel
- 45) Ducoste, J.J., 2005, Simulation of Flocculation in Stirred Vessels using Quadrature Method of Moments: Evaluation of Lagrangian versus Eulerian Approaches, Invited

Presentation at Department for Applied Mathematics, Biometrics and Process Control, Ghent University, Ghent, Belgium

- 46) Ducoste, J.J., 2005, Impact of Upstream Hydraulic Structures on UV Reactor Performance, Invited Presentation at Borchardt Conference, University of Michigan, Ann Arbor, MI
- 47) Ducoste, J.J., 2004, Numerical Prediction of the Reduction Equivalent Fluence Bias, Invited Presentation at Degremont North American Research & Development Center, Richmond, VA
- 48) Ducoste, J.J., 2004, Characterization of Dose Distribution in UV Reactors, Invited Presentation at Pennsylvania State University Department of Civil Engineering
- 49) Ducoste, J.J., 2003, The Intricacies of using Numerical Models for Analyzing/Designing Ultraviolet UV Disinfection Reactors, Invited Presentation at North Carolina Central University Environmental Engineering Science Program
- 50) Ducoste, J.J., 2001, An Overview of Computational Fluid Dynamics Modeling for Evaluation of Water and Wastewater Treatment Process Performance, Invited Presentation at Duke University Department of Civil and Environmental engineering
- 51) Ducoste, J.J., 2000, Modeling Flocculation in Water Treatment Processes: Impact of Tank Size and Impeller Configuration, Invited Presentation, Engineering Foundation on Population Balance Modeling of Particulate Systems, Kailua-Kona, Hawaii. (A portion of the invited speakers conference fees are waived by the conference organizers.)
- 52) Ducoste, J.J., 2000, IDDF Approach to Enhanced Reactor Hydraulic Characterization, Invited Presentation, Department of Civil and Environmental Engineering, Marquette University, (Seminar part of the Metcalf Chair)
- 53) Ducoste, J.J., 2000, Water Scarcity in the 21st Century: Has Time Come for Water Reuse, Invited Presentation, Public Forum at Marquette University, (Seminar part of the Metcalf Chair)

Presentations (No Paper)(* = Presenter)

- 1) Karam, A.L., Ducoste, J.J., de los Reyes III, F.L., 2017, Development of Photochemical Microsensors for Evaluating Light Distribution within Microalgal Photosynthetic Bioreactors, AEESP Conference, Ann Arbor Michigan, June 22-24
- 2) de los Reyes, F. L. III, L. Wang, P. Shen, J. Yeh, T. Aziz, and J. Ducoste (2016). Directing microbial community assembly in anaerobic reactors: implications for increasing methane yields and improving start-up. WRII Conference, March 17-18, 2016, Raleigh, NC
- 3) *Hao, Z., Sun, M., Ducoste, J., Barlaz, M., Benson, C., Castaldi, M., Luetlich, 2016, Understanding and Predicting Temperatures in Municipal Solid Waste Landfills, Global Waste Management Symposium, January 31-February 3, Indian Wells, CA
- 4) Cranos Williams, Alexandr Koryachko, Anna Matthiadis, Durreshahwar Muhammad, Jessica Foret, Siobhan M. Brady, Joel Ducoste, James Tuck, Terri A. Long., 2016,

“Clustering and Differential Alignment Algorithm: Identification of Early Stage Regulators in the *A. thaliana* Iron Deficiency Response.” Pittcon Conference, Atlanta, GA, March 2016.

- 5) Anna Matthiadis, Alexandr Koryachko, Durreshahwar Muhammad, Jessica Foret, Siobhan M. Brady, Joel Ducoste, James Tuck, Cranos Williams, and Terri A. Long., 2016, “Computational prediction of regulatory relationships: New players in the *Arabidopsis thaliana* iron deficiency response.” Salt & Minerals Symposium, American Society of Plant Biology (ASPB) Annual Meeting, Austin, TX, July 2016.
- 6) *Wang, L, Hossen, E., Aziz, T.N., Ducoste, J., de los Reyes, F.L., 2015, How to train your digester - Using step and pulse feeding of grease waste to increase community resistance and methane yield above 336%, Student Platform Presentation Speaker, Air & Waste Management Association (A&WMA), 108th Annual Conference & Exhibition, Raleigh NC
- 7) *Wang, L, Hossen, E., Aziz, T.N., Ducoste, J., de los Reyes, F.L., 2015, How to train your digester - Step and pulse feeding of grease interceptor waste increased community resistance and methane yield by up to 350%, “Fresh Ideas” Poster session, Annual Conference & Exposition (ACE), American Water Works Association (AWWA), Anaheim, California
- 8) Anna Matthiadis, Alexandr Koryachko, Durreshahwar Muhammad, Jessica Foret, Siobhan M. Brady, Joel Ducoste, James Tuck, Cranos Williams, and Terri A. Long., 2015, Algorithm application to identify novel regulators in the *Arabidopsis thaliana* iron deficiency response. Systems Biology and New Approaches Session, International Conference on Arabidopsis Research (ICAR), Paris, France, July, 2015.
- 9) Anna Matthiadis, Alexandr Koryachko, Durreshahwar Muhammad, Jessica Foret, Siobhan M. Brady, Joel Ducoste, James Tuck, Cranos Williams, and Terri A. Long. “Algorithm application to identify novel regulators in the *Arabidopsis thaliana* iron deficiency response.” Ionomics Workshop, International Conference on Arabidopsis Research (ICAR), Paris, France, July, 2015
- 10) Wang, L., Hossen, E.H., Aziz, T.N., Ducoste, J., Bullard, M., de los Reyes, F.L., 2014, Step and Pulse Feeding Of Anaerobic Co-Digesters Treating Thickened Waste Activated Sludge and Grease Interceptor Waste, Water Resources Research Institute Annual Conference, Raleigh, NC, March 19
- 11) Anna Matthiadis, Alexandr Koryachko, Durreshahwar Muhammad, Joel Ducoste, James Tuck, Cranos Williams, and Terri Long., 2014, “Using a systems biology approach to identify key transcriptional regulators in the *Arabidopsis thaliana* iron deficiency response.” 9th International BioMetals Symposium, Poster Presentation, Duke University, July 2014.
- 12) Weaver, J., Ducoste, J., de los Reyes, F.L., 2014, Influencing Aerobic Granulation through Variable Shear in an Eccentric Couette Micro-Reactor, NC AWWA/WEA Conference, Winston Salem NC, Nov 16-19
- 13) *He, X., Ducoste, J., de los Reyes, F., 2012, A Comprehensive Mechanistic Model Showing How Fat, Oil, and Grease (FOG) Deposits Form in Sewer Lines, NC AWWA-WEA Annual Conference Raleigh, NC., Nov. 11-14
- 14) *Wang , Y., Ducoste, J., Challenges in the Measurements of Fat, Oil and Grease in Food Service Establishment Waste Streams, 2012, NC AWWA-WEA Annual Conference Raleigh, NC., Nov. 11-14

- 15) *Song, J., Chen, H., Shuford, C.M., Li, Q., Shi, R., Muddiman, D.C., Williams, C.M., Ducoste, J., Sederoff, R.R., Chiang, V.L., 2012, Mechanistic Modeling Frameworks for Multiple Enzyme Regulation in Metabolic Pathway, KSEA South Atlantic Regional Conference, Nov 15-17
- 16) *Aziz, T.N., Wang, L., Long, J.H., Ducoste, J.J., de los Reyes, III, F.L., 2012, Sustainable Energy from Grease Interceptor Waste Co-Digestion, NC AWWA-WEA Annual Conference Raleigh, NC., Nov. 11-14
- 17) *Iasmin, M., Ducoste, J., 2012, Factors that Influence the Physical and Chemical Characteristics of Fat, Oil, and Grease Deposits in Sewer Systems, North Carolina Water Resources Research Institute, March 28
- 18) *He, X., de los Reyes, F.L., Ducoste, J., 2012, How do Fat, Oil, and Grease Deposits form in Sewer Lines, North Carolina Water Resources Research Institute, March 28
- 19) Aziz*, T.N., Long, J.H., Wang, L., de los Reyes, F.L., Ducoste, J.J., 2012, Exploring Sustainable Energy from Grease Interceptor Waste, WRRRI Annual Conference & NCWRA Symposium, Raleigh, NC.
- 20) *Williams, C.M., Chen, H., Song, J., Ducoste, J., Shuford, C.M., Li, Q., Liu, J., Shi, R., Muddiman, D.C., Sederoff, R.R., Chiang, V.L., 2012, Predictive Models of Regulatory and Metabolic Pathways for Monolignol Biosynthesis in *Populus trichocarpa*, Plant & Animal Genome XX Conference, Jan. 14-18, San Diego, CA
- 21) *He, X., Ducoste, J., de los Reyes, F.L., 2011, How are Fat, Oil and Grease (FOG) Deposits Formed in Sewer Lines?, NCAWWA/WEA, Nov 15,16, Winston-Salem, NC
- 22) *Karami, B., de los Reyes, F., Ducoste, J., 2011, Studying Formation of Nitrifying Aerobic Granules and Effect of Shear Distribution on Granulation NCAWWA/WEA, Nov 15,16, Winston-Salem, NC
- 23) *Arafin, M., Ducoste, J., 2011, Modeling and experimental Evaluation of UV LED Reactor using Computational Fluid Dynamics (Poster), NCAWWA/WEA, Nov 15,16, Winston-Salem, NC (3rd prize award)
- 24) *Ducoste, J., 2011, Water and Waster Treatment Process on Steroids: Using Computational Fluid Dynamics to Drive out Unit Process Inefficiencies, KECKS Futures Initiative, Nov 10-13, Irvine, CA
- 25) Sobriminsana*, Ducoste, de los Reyes, 2011, Combining CFD, floc dynamics, and biological reaction kinetics to model carbon and nitrogen removal in an activated sludge system, WRRRI, March 21, Raleigh, NC
- 26) Gallimore*, Ducoste, Assessment of Grease Abatement Systems, WEF Sewer Collection System Conference, NCAWWA/WEA, Nov 15,16, Winston-Salem, NC
- 27) Vallabh, R., Seyam, A.M.*, Banks-Lee, and Ducoste, J., Tortuosity in Fibrous Porous Media, the Proceedings of the 7th International Conference of Textile Research Division, National Research Center, Cairo, Egypt, October 10-12, 2010.

- 28) Vallabh, R., Seyam, A.M.*, Banks-Lee, and Ducoste, J., Tortuosity of Nonwoven Structures, the 7th International Conference of Textile Research Division, National Research Center, Cairo, Egypt, October 10-12, 2010.
- 29) Vincent Chiang*, Ron Sederoff, John Ralph, Joel Ducoste, Fikret Isik, Cranos Williams, David Muddiman, Lignin proteome, metabolome, enzymology, biochemistry, transgenics, structural chemistry, and systems modeling, Forest Biotechnology Industry Research Consortium (FORBIRC) Annual Meeting McKimmon Center, NCSU, May 26-28, 2010
- 30) Cranos Williams*, Joel Ducoste, Jina Song, Fikret Isik, Ron Sederoff and Vincent Chiang Predicting regulatory control of lignin biosynthesis using signaling graph methodology Forest Biotechnology Industry Research Consortium (FORBIRC) Annual Meeting McKimmon Center, NCSU, May 26-28, 2010
- 31) Joel Ducoste*, Cranos Williams, Jina Song, His-Chuan Chen, Fikret Isik, Ron Sederoff and Vincent Chiang, Regulatory constrained flux balance analysis of monolignol biosynthesis Forest Biotechnology Industry Research Consortium (FORBIRC) Annual Meeting McKimmon Center, NCSU, May 26-28, 2010
- 32) Sobriminsana*, Ducoste, de los Reyes, 2010, A Numerical Approach for Modeling Carbon and Nitrogen Removal Under the Influence of Floc Size Distribution, IWA Leading Edge Conference, Pheonix, AZ June 4-8, 2010
- 33) de los Reyes, F., *Ducoste, J., 2010, Factors Affecting the Formation of FOG Deposits in Sewer Lines, Urban Water Consortium Meeting, June 4, Raleigh NC
- 34) Xia*, Ducoste, de los Reyes, 2010, Investigating the Formation of Fat Oil and Grease Deposits in Sewer Collection Systems, WRII Conference, Raleigh, NC March 15....
- 35) Alpert, S. M., & Ducoste, J. J., 2009, Validation of CFD Models Simulating the UV/H₂O₂ Advanced Oxidation Process. North Carolina AWWA/WEA Annual Conference, Raleigh, NC.
- 36) *de los Reyes, F., *Ducoste, J., 2009, Factors Affecting the Formation of FOG Deposits in Sewer Lines, Urban Water Consortium Meeting, March 11, Burlington NC
- 37) *Sobremisana, A., F. L de los Reyes III, and J. J. Ducoste (2009) Simultaneous Modeling Carbon and Nitrogen Removal under the Influence of Floc Size Distribution. NC American WaterWorks Association/Water Environment Association Annual Conference, November 15-18, Raleigh, NC
- 38) Ducoste, J., *Aziz, T., Buckley, T., Movahed, Z., Card, C., Gallimore, E., 2008, Design Considerations for Volume Based Grease Interceptors, Chesapeake Water Environment Association Conference on Collection Systems, November 14, Linthicum, MD
- 39) *Ducoste, J., 2008, Improving our Understanding of Complex Reacting Processes in Water and Wastewater Treatment through Computational Fluid Dynamics, National Academy of Engineering Frontiers of Engineering Conference, November 17-19, Kobe, Japan

- 40) *Sobrimisana A., de los Reyes, F., Ducoste, J., 2008, A Numerical Approach for Modeling Carbon and Nitrogen Removal under the Influence of Floc Size Distribution poster presentation, NCAWWA/WEA 88th Annual Conference, November 16-19, Winston Salem, NC
- 41) *Gallimore, E., Ducoste, J.J., 2008, Performance of Grease Interceptors: Evaluating Design Alternatives, poster presentation, NCAWWA/WEA 88th Annual Conference, November 16-19, Winston Salem, NC
- 42) de los Reyes, F. L., J. Ducoste, M. Hyman, C. Mota, D. Aslett, and H. Hong (2007), New Approaches in Determining the Spatial and Metabolic Interactions of Nitrogen-Transforming Bacteria in Microbial Flocs, NSF MO/MIP Meeting, Mar. 1, Washington, DC
- 43) *Liu, Y. and Ducoste. J.J., 2005, Impact of Turbulent Mixing on Chloramines Formation Proceedings Chesapeake Section AWWA Annual Conference, Dover, DE
- 44) *Richards, B., J.J., Ducoste, 2004, Characterizing Sequential Disinfection in Flow Through Systems, 4th Annual Eastern Regional Conference, New Bern. NC
- 45) *Prat, O., Ducoste, J.J., 2004, Performance Analysis of Quadrature Method of Moments (QMOM) for PBM Systems used in Assessing Flocculation Processes in Water and Wastewater Treatment, 2nd International Population Balance Modeling, Valencia, Spain May 7-9
- 46) *Ducoste, J.J., V., Ortiz, Y., Liu, 2002, A Multifluid Modeling Approach to Characterizing Chemical Dispersion in Drinking Water Treatment, Water Resources Research Institute Annual Conference, Raleigh, NC, April 9

B. **Recognized Creative Artistry and Professional Accomplishments** - Include publication of creative or professional works, exhibitions, honors, awards, fellowships, prizes, competitions, and other pertinent evidence.

American Academy of Environmental Engineering and Science Excellence in Environmental Engineering and Science University Research Honor Award	2017
Board certified environmental engineer through eminence	2016
Keynote Speaker British Water FOG Forum, Cranfield UK	2015
National Academy of Engineering KECK Future Initiative Symposium Participant	2011
NSF Advance Scholar	2009
National Academy of Engineering Frontiers of Engineering Japan Symposium Participant	2008
Associate Editor, Journal of Environmental Engineering ASCE	2007

Fulbright Scholar	2006
FWO Visiting Faculty Scholar University of Ghent, Belgium	2006
Faculty Early Career Development (CAREER) Award from NSF	2001
Ralph Metcalfe Chair for Minority Scholars at Marquette University	2000

- C. **Technology Transfer** - Include invention disclosures, patents files and patents awarded, new cultivars developed and released, major software packages, design patents, and other pertinent evidence.

Case #: 13192

Title: Process of developing aerobic granules in activated sludge using shear variation

Lead Inventor: Francis de los Reyes

Co-Inventors: Joel Ducoste, Bahareh Karami

- D. **Cross-Disciplinary Activities** - Include participation in centers, institutes, and other organized research efforts between departments within and across colleges.

- **Collaborating with Amy Grunden (Microbiology), Heike sederoff (Plant Biology) on the development of photobioreactors for microalgae harvesting and production of lipids for biofuels**
- **Collaborating with Cranos Williams (Electrical Engineering), Terri Long (Plant Biology), John Tuck (Electrical Engineering) on a Biosystems modeling project for Iron deprivation in plants**
- **Collaborating with Imara Perera (Plant biology), Brian Phillips (Plant Biology), Cranos Williams (Electrical Engineering), and Glenda Gillaspay (Biochemistry Virginia Tech) on Myo-inositol pathway regulation in plant cells**
- Collaborated with Jim Burton in Horticulture on the assessment of alternative herbicides for the abatement of roots intrusion in sewer pipe lines
- Collaborated on a proposal involving Marty Hubbe and Orlando Rojas from Pulp and Paper Science and Melissa Pasquinelli from Textile Engineering to understand the structure and reactivity of zero-valent iron nanoparticles, using molecular dynamics simulations. A proposal to NSF was submitted in September 2009.
- **Collaborating on an NSF project involving Vincent Chiang and Ron Sederoff from Forestry department, and William Edmonson and Windser Alexander from Electrical engineering on developing biosystem models for the analysis tree plant cell metabolism for the production of lignin.**
- Collaborated with Michael Hyman in Microbiology with Francis de los Reyes to understand how the microbial ecology changes with physical floc conditions in an activated sludge reactor.
- Collaborated with the Kenan Institute for Engineering, Technology, and Science as a University mentor for the Kenan Fellows for Curriculum and Leadership Development program. The program involves working with a middle school teacher to integrate water quality and treatment concepts into the K-12 curriculum.
- Collaborated on a project involving fat, oil, and grease deposit formation in sanitary sewers with Kevin Keener in the Food Science department.

- Collaborated on a project to develop a program designed to increase the number of graduates in science, technology, engineering and mathematics (STEM) with John Fountain in MEAS department
- A participant in a 5 yr NSF REU project with Christine Grant and Steven Peretti (CHE Dept.)
- Collaborated on a proposal involving the demonstration and evaluation of a constructed wetland and spray field system for leachate treatment with Sarah Liehr of BAE. The proposal has been submitted to SEAGRANT and is pending
- Collaborated on a project involving modeling nitrogen transport in duckweed ponds for secondary treatment of swine wastewater with Jiayang Cheng of BAE
- Collaborated on two proposals and a project involving the design and implementation of a reconfigurable computer for simulation of turbulent-induced flocculation models with Clay Gloster (formerly of the ECE Dept.)
- Collaborated on Combined Research-Curriculum Development (CRCD) NSF Proposal with Christine Grant NCSU-CHE, Clay Gloster NCSU-ECE, Richard Felder NCSU-CHE, Sandra Williams NCSU-Education, and Fred Boadu DUKE-CE, that looks at using high computing techniques to integrate engineering research into curriculum development.

IV. Extension And Engagement With Constituencies Outside The University

Co-chaired the UV Measurement sessions at the IUVA 2nd International Congress on Ultraviolet Technologies in Vienna, Austria, July, 2003

Member of Senior Project Review for New York City Department of Environmental Protection (DEP) Catskill and Delaware UV Disinfection Facility

This work consists of the evaluation of computer modeling and/or biosimetry testing data developed for validation of the ultraviolet light (UV) reactors to be installed within the New York City Department of Environmental Protection (DEP) Catskill and Delaware UV Disinfection Facility. The Catskill and Delaware system supplies nearly 90% of the 2 billion gallons of drinking water consumed daily in New York City. The DEP has developed a Conceptual Design of the UV disinfection facility that incorporates low pressure high output (LPHO) UV reactors with nominal capacities of 40-mgd. As part of the Conceptual Design, DEP began a modeling program with the basic goal of using modeling as a means for validating full-scale UV reactors.

Member of Senior Project Review for Hydraulic Feasibility and Demonstration-Scale UV Testing at the Richard Miller Treatment Plant

The Greater Cincinnati Water Works (GCWW) requests for professional engineering services to conduct a hydraulic feasibility and cost effective analysis for the purpose of evaluating an optimal location for UV (Ultra Violet) technology installation into the existing treatment process and to provide recommendations for the most viable and cost effective UV technology for the Richard Miller Treatment Plant (RMTP). The project include services to design and conduct a yearlong demonstration-scale UV study at the RMTP to collect operation and maintenance data including performing feasible microbial inactivation tests and Computational Fluid Dynamics (CFD) modeling.

Performed consulting work for ATLANTIUM Inc and Gas Delivery Systems (GDS) that involved the review of Ultraviolet modeling work performed by both companies. In addition, modeling work was performed by me to review strategies for GDS to improve their UV reactor design.

Provided senior review of the modeling section of the EPA UV Guidance manual

Summary of Consulting Services

Fall 1999, Fall 2000, Fall 2003	CH2M HILL	Senior reviewer for CFD models of disinfection contactor designs and UV systems (See Extension section)
Spring 2002, Fall 2002, Fall 2003	Hazen & Sawyer	Senior reviewer for CFD models of UV reactor designs with the city of New York (See Extension section)
Spring 2003	Novo Nordisk	Senior reviewer for waste discharge project. This project was performed through CE 481 senior design course.
Summer 2005 Spring 2006	Atlantium	Senior reviewer for CFD models of UV reactor for drinking water disinfection (See Extension section)

Fall 2005	GDS Inc	Senior reviewer for CFD models of UV reactor for drinking water disinfection (See Extension section)
Fall 2006	CH2M HILL	Senior Reviewer UV Disinfection System, Cincinnati
Fall and spring 2011	Eaton	Senior reviewer of UV disinfection design of new reactors for Ballasted flocculation
Fall 2011, Spring 2012	WRF	Senior review of UV Validation of UV reactors for NYC
Spring and Summer 2012	Arcadis/ MalcomPirnie	Senior reviewer for UV installation design for City of Rochester NY and Los Angeles CA
Fall 2012, Spring 2013	SETI	Developing CFD models of novel UV LED reactors
Spring 2014	Arcadis/ MalcomPirnie	Senior reviewer for UV low wavelength assessment of action spectra correction factor design for City of Los Angeles CA