DongWon Choi, PhD

Department of Biological and Environmental Sciences
Texas A&M University-Commerce, Commerce, TX 75429
Phone: 903-886-5221
Email: dongwon.choi@TAMUC.edu

EDUCATION

Ph.D. Microbiology, 2007, Iowa State University
M.S., Microbiology, 2000, Ball State University, Muncie, IN
B.E., Biotechnology, 1997, Taegu University, Taegu, Korea (R.O.K.)

ACADEMIC WORK EXPERIENCE:

Aug. 2010 – Present, Assistant Professor, Department of Biological and Environmental Science, Texas A&M University-Commerce
Fall, 2007 – Aug. 2010, Post Doctoral Research Associate, Center for Sustainable Environmental Technologies (CSET), Iowa State University
2004 - 2007, Research Assistant, Department of Biochemistry, Biophysics, and Molecular Biology, Iowa State University
2000 –2004, Teaching Assistant, Department of Microbiology, Iowa State University
1999, Teaching Assistant, Department of Microbiology, Ball State University

PROFESSIONAL MEMBERSHIP

American Society for Microbiology
Society of Industrial Microbiology

SYNERGISTIC ACTIVITIES

Biocatalyst Program Manager, CSET, Iowa State University
Ad-hoc Reviewer for *Energy & Fuels*
Ad-hoc Reviewer for *Energy- The International Journal*
Ad-hoc Reviewer for *Biomass & Bioenergy*
Outstanding Reviewer Award 2014
NSF 2014-2015 GRFP panelist

AWARDS

Faculty Senate Recognition Award of Research, Scholarship & Creative Activity "Unfettered Thought", 2014

PATENTS AND INVENTION DISCLOSURE MEMORANDUMS

DiSpirito, A. A., **Choi, Dong W.**, and Semrau, J. D. 2007. Use of methanobactin in the production of gold nanoparticles. United States Patent and Trademark Office. Washington, DC.

GRANTS

Algae-cultivation and pyrolytic recovery. CoPI, *Renewable Energy Project, Iowa Energy Center.* FY11-13, $272,320

Algae-cultivation and pyrolytic recovery, PI : Subcontract award, *Renewable Energy Project, Iowa Energy Center*, FY 11-13, $75,000 awarded, $ 25,000 received

Start-up fund, Biological and Environmental Sciences, Texas A&M University-Commerce, FY 11 – 2013, $50,000

A road Towards Light Driven Bio-Hydrogen Production, PI, Faculty Research Enhancement Grant, TAMUC University Research & Creative Activities Advisory Committee, FY 11-12, $18,000

Faculty Development Grant, TAMUC University Research & Creative Activities Advisory Committee, FY 2012, $700

Acquisition of an inductively coupled plasma optical emission spectrophotometer to improve multi-disciplinary elemental research and education, CoPI, NSF equipment, FY 13-14, *Declined*

A novel photobioreactor for the elimination of dewatering process and enhanced biomass productivity, PI, Norman Hackerman Advanced Research Program, FY 13-15, *Declined*

Development of Improved Purification Method of Methanobactin from *Methylosinus trichosporium* OB3b, Faculty Research Enhancement Grant, TAMUC University Research & Creative Activities Advisory Committee, FY 13-14, $10,348

Selective metal ion recognition of methanobactin peptides, CoPI, NSF RUI, FY 2015-2018, *Declined*

Summer Undergraduate Research Experience in Biological Sciences (Bio-SURE), PI, NSF REU, FY 2015-2018, *Declined*

Selective copper ion recognition and redox activity of methanobactin analog peptides, CoPI, NSF RUI, FY 2016-2019, *Declined*

Summer Undergraduate Research Experience in Biological Sciences (Bio-SURE); From Cells to Ecosystems, PI, NSF REU, FY 2016-2019, *Pending*

PUBLICATIONS

Peer Reviewed Journal Publications

Choi, D.-W., R.C. Kunz, E.S. Boyd, J.D. Semrau, W.E. Antholine, J.-I. Han, J.A. Zahn, J.M. Boyd, A.M. de la Mora, and A.A. DiSpirito. 2003. The membrane-associated methane monooxygenase (pMMO) and pMMO-NADH:quinone oxidoreductase complex from *Methylococcus capsulatus* Bath. J. Bacteriol. 185: 5755 –5764.

Choi, D.-W, W. E. Antholine, Y.S. Do, Jeremy D. Semrau, C.J. Kisting, R.C. Kunz, D. Campbell, V. Rao, S.C. Hartsel, and A.A. DiSpirito. 2005. Effect of methanobactin on the activity and electron paramagnetic resonance spectra of the membrane associated methane monooxygenase on *Methylococcus capsulatus* Bath. *Microbiology* 151, 3417-3426.

Choi, D.-W, C.J. Zea, Y.S. Do, J.D. Semrau, W.E. Antholine, M.S. Hargrove, N.L. Pohl, E.S. Boyd, G. G. Geesey, S.C. Hartsel, P.H. Shafe, M.T. McEllistrem, C.J. Kisting, D. Campbell, V. Rao, A.M. de la Mora, and A.A. DiSpirito. 2006. Spectral, Kinetic, and thermodynamic properties of Cu(I) and Cu(II) binding by methanobactin from *Methylosinus trichosporium* OB3b. *Biochemistry* 45, 1442-1453.

Choi, D.-W, Y.S. Do, C.J. Zea, Marcus T. McEllistrem, S-W Lee, J.D. Semrau, N.L. Pohl, C.J. Kisting, L.L. Scardino, S.C. Hartsel, E.S. Boyd, G.G. Geesey, T.P. Riedel, P.H. Shafe, K.A. Karanski, J.R. Tritsch, W.E. Antholine, and A.A. DiSpirito. 2006. Spectral and thermodynamic properties of Ag(II), Au(III), Cd(II), Co(II), Fe(III), Hg(II), Mn(II),

Ni(II), Pb(II), U(IV), and Zn(II) binding by methanobactin from *Methylosinus trichosporium* OB3b. Journal of Inorganic Biochemistry 100, 2150-2161.

Marlène Martinho, **Dong W. Choi**, Alan A. DiSpirito, William E. Antholine, Jeremy D. Semrau, and Eckard Münck. 2007. Mössbauer Studies of the Membrane-Associated Methane Monooxygenase from *Methylococcus capsulatus* Bath: Evidence for a Diiron Center. *J. Am. Chem. Soc*. 129, 15783-15785

Choi DW, Semrau JD, Antholine WE, Hartsel SC, Anderson RC, Carey JN, Dreis AM, Kenseth EM, Renstrom JM, Scardino LL, Van Gorden GS, Volkert AA, Wingad AD, Yanzer PJ, McEllistrem MT, de la Mora AM, Dispirito AA. 2008. Oxidase, superoxide dismutase, and hydrogen peroxide reductase activities of methanobactin from type I and II methanotrophs. J. Inorgan. Biochem. *E-published*.

Behling, L. A.; Hartsel, S. C.; Lewis, D. E.; DiSpirito, A. A.; **Choi, D. W.**; Masterson, L. R.; Veglia, G.; Gallagher, W. H. 2008. NMR, Mass Spectrometry and Chemical Evidence Reveal a Different Chemical Structure for Methanobactin That Contains Oxazolone Rings. *J. Am. Chem. Soc.* 130(38), 12604-12605.

Choi, D.W., Chipman, D., Bents, S. and Brown, R. 2010. A Techno-economic analysis of polyhydroxyalkanoate and hydrogen production from syngas fermentation of gasified biomass. Appl. Biochem. Biotech. 160(4), 1032-1046

Haiyang Zhu, Brent H. Shanks, **Dong W. Choi**, and Theodore J. Heindel. 2010. Effect of functionalized MCM41 nanoparticles on syngas fermentation. Biomass & Bioenergy. 34(11), 1624-1627

D.W. Choi, N. Bandow, M.T. McEllistrem, J.D. Semrau, W.E. Antholine, S.C. Hartsel, W. Gallagher, N.L. Pohl, C.J. Zea, J.A. Zahn, and DiSpirito, A.A. 2010. Spectral and Thermodynamic properties of methanobactin from gamma-proteobacterial methane oxidizing bacteria: A case for copper competition on a molecular level. J. Inorgan. Biochem. 104(12) 1240-1247

Karl H. Summer, Josef Lichtmannegger, Bernhard Michalke, Nathan Bandow, **Dong W. Choi**, Alan A. DiSpirito, 2011. The biogenic methanobactin is an effective chelator for copper in a rat model for Wilson disease. J. Trace Elem. Med. Biol. 25, 36-41

N. L. Bandow, W. H. Gallagher, L. Behling, **D. W. Choi**, J. D. Semrau, S. C. Hartsel, V. S. Gilles, A. A. DiSpirito, 2011, Isolation of methanobactin from the spent media of methane-oxidizing bacteria. Methods Enzymol. 495, 259-269

Layton DS, Ajjarapu A, **Choi D**, Jarboe LR, 2011. Engineering ethanologica *Escherichia coli* for levoglucosan utilization. Biores Technol 102, 8318-8322

Jarboe LR, Wen Z, **Choi D**, Brown RC, 2011, Hybrid thermochemical processing: fermentation of pyrolysis-derived bio-oil. Appl. Microbiol Biotechnol. 91, 1519-1523

9th out of 22 authors, 2012, Spectral and Copper Binding Properties of Methanobactin from the Facultative Methanotroph *Methylocystis* strain SB2. J Inorg Chem. 110, 72-82

DongWon Choi, Ramakrishna Sesham, Yuri Kim, Laurence A. Angel, 2013, Analysis of methanobactin from *Methylosinus trichosporium* OB3b via ion mobility mass spectrometry, Eur J Mass Spectrom, 18, 509-520.

Ramakrishna Sesham**, DongWon Choi,** Anupama Balaji, Sahithi Cheuku, Chiranjeevi Ravichetti, Aisha Alshahrani, Beheshbabu Nasani, and Laurence Angel, 2013, The pH dependent Cu(II) and Zn(II) binding behavior of an analog methanobactin peptide, Eur J Mass Spectrom, 19, 463-473

DongWon Choi, Aisha A. Alshahrani, Yshodharani Vytla, Manogna Deeconda, Victor Serna, Fobert Saenz and Laurence A. Angel, 2015, Redox activity and multiple copper (I) coordination of 2His-2Cys oligopeptides, Mass Spectrom, 50(2), 316-325

Book Chapters

DiSpirito, A.A., R.C. Kunz, **D.W. Choi**, and J.A. Zahn. 2004. Respiration in methanotrophs. *In* Respiration in Archaea and Bacteria. Vol. 16. Ch. 7. p. 141 - 169. D. Zannoni(ed.) Kluwer Scientific, The Netherlands.

D.W. Choi, A.A. DiSpirito, D. Chipman, and R.C. Brown. 2011. Hybrid Processing. *In* Thermochemical Processing of Biomass into Fuels, Chemicals, and Power. Ch 9. R.C. Brown(ed.) John Wiley & Sons Ltd.

UNPUBLISHED CONFERENCE PRESENTATIONS

Gordon Research Conference, *Molecular basis of microbial one carbon metabolism, Jul 7-12, 2002, Connecticut College, New London, CT*

Kunz, R.C., **D-W. Choi**, J.A. Zhan, J.D. Semrau, J-I. Han, E.S. Boyd, and A.A. DiSpirito. Effect of copper concentration on membrane development and expression of the membrane-associated methane monooxygenase in *Methylococcus capsulatus* Bath. (Poster)

Gordon Research Conference, *Molecular basis of microbial one carbon metabolism, Aug 1-6, 2004, Mount Holyoke College, South Hardley, MA*

Choi, D.W., W.E. Antholine, Y. S. Do, C. Kisting, H. J. Kim, D. W. Graham, J. D. Semrau, D. H. Kim, and A. A. DiSpirito. Copper binding by methanobactin from *Methylosinus trichosporium* OB3b (Poster)

H. J. Kim, **D. W. Choi**, D. W. Graham, Y. S. Do, C. Kisting, M. A. Alterman, N. Galeva, C. Larive, and A. A. DiSpirito. Primary structure of methanobactin from *Methylosinus trichosporium* OB3b (Poster)

Gordon Research Conference, *Applied and Environmental Microbiology, July 24-29, 2005, Connecticut College, New London, CT*

David R. Keeney, **Dong-Won Choi**, Alan A. DiSpirito, Jeremy D. Semrau. Genetics and Biochemical Characterization of Methanobactin from *Methylosinus trichosporium* OB3b (Poster)

Gordon Research Conference, *Molecular basis of microbial one carbon metabolism, Aug 6-11, 2006, Magdalen College, Oxford, UK*

Dong W. Choi, Y.S. Do, C.J. Zea, M.T. McEllistrem, S-W. Lee, J.D. Semrau, N.L. Pohl, C.J. Kisting, E.S. Boyd, G.G. Gessey, W.E. Antholine, and A.A. DiSpirito. Spectral and Thermodynamic Properties of Au(III), Cd(II), Co(II), Fe(III), Hg(II), Mn(II), Ni(II), U(IV), and Zn(II) Binding by Methanobactin from *Methylosinus trichosporium* OB3b (Poster)

Dong W. Choi, Young S. Do, Marcus T. McEllistrem, S. -W. Lee, J.D. Semrau, C.J. Kisting, W.E. Antholine, and A.A. DiSpirito. Redox, Superoxide Dismutase and NADH/Duroquinol Oxidase Activities of Methanobactin from *Methylosinus*

trichosporium OB3b (Poster)
Keeney, D.R., **D-Won Choi**, A.A. DiSpirito, J.D. Semrau. Preliminary characterization of methanobactin synthesis in *Methylosinus trichosporium* OB3b (Poster)

Biobased Industry Outlook Conference, *Nov 3, 2007, Ames, Iowa*
Chipman, D.C., Y.S. Do, **D.W. Choi**, et al. Syngas Fermentation Research Facility at Iowa State University (Poster)

30th Symposium on Biotechnology for Fuels and Chemicals, *May 4-7, 2008, Astor Crown Plaza Hotel, New Orleans, LA*
David C. Chipman, **Dong-Won Choi**, Samuel T. Jones, and Robert C. Brown. Optimization of PHA Production in *Rhodospirillum rubrum* Cultured on Carbon Monoxide from Synthesis Gas (Poster)

Biobased Industry Outlook Conference, *Sep 3, 2008, Ames, Iowa*
Chipman, D.C., **D.W. Choi**, and Brown, R. C. Growth media optimization for polyhydroxyalkanoate and hydrogen coproduction from *Rhodospirillum rubrum* cultured on synthesis gas (Poster)

2011 Annual Research Symposium, Texas A&M University-Commerce, Commerce, TX
Henry Patrick MacKnight, Juan Antonio Montes, and **DongWon Choi**, Optimization of Lipid Productivity in *Chlamydomonas reinhardtii*
Qiyan Fu and **DongWon Choi**, The mechanism of Microalgae cultivation under elevated CO_2

2011 Pathways Symposium, Texas A&M University, College Station, TX
Yuri Kim, **DongWon Choi**, Michael C. Hanna, and Laurence A. Angel, Gene Cloning of Zinc Finger (Zif268) and Identification by Ion Mobility Mass Spectrometry

Henry Patrick MacKnight, Laura Garland, and **DongWon Choi**[†], Growth Optimization of *Chlamydomonas reinhardtii* for Pyrolytic Conversion

2012 Pathways Symposium, Texas A&M University, Galveston, TX
Henry Patrick MacKnight, DongWon Choi, Growth Optimization of Chlamydomonas reinhardtii under elevated CO_2

Naveen Yegyan, DongWon Choi, Improved methanobactin purification isolated from *Methylosinus trichosporium* OB3b

2013 Pathways Symposium, Texas A&M University-Kingsville, Kingsville, TX
Victoria Walters, Israel Chavarri, and **DongWon Choi**, Optimization of cultivation of *Methylosinus trichosporium* OB3b for improved methanobactin production

Ella Harper, Zachary Weaks, **DongWon Choi**, Growth optimization for *Chlamydomonas reinhardtii* under variant nitrogen concentrations for pyrolytic conversion

2015 Federation of North Texas Area Universities Research Symposium, Texas Woman's University, Denton, TX, Israel Chavarri and **DongWon Choi,** Reductive Damage of Methanobactin Isolated from *Methylosinus trichosporium* OB3b

2015 Annual Research Symposium, Texas A&M University-Commerce, Commerce, TX Israel Chavarri, Shakti Gurung, JiHyun Kim, and **DongWon Choi**, Cultivation Optimization of *Methylosinus trichosporium* OB3b for methanobactin preparation

SEMINARS PRESENTED

BIO International Convention, *2010, McCormick Place Convention Center, Chicago, IL* **DongWon Choi**. Syngas fermentation: Bacterial tolerance development (Invited panel speaker)

Physics Colloquium, 2012, Texas A&M University-Commerce, Energy Metabolism in Microbial Production of Fuels and Chemicals, **DongWon Choi**

Honors College Colloquium, 2014, Texas A&M University-Commerce, Biofuel Production Closing the Loop of Global Carbon Cycle, **DongWon Choi**

REVIEWED NATIONAL SCIENCE FOUNDATION PROPOSALS

2014-2015 GRFP, As a GRFP panel reviewer, reviewed 32 proposals and ranked them. Recommended 3 high quality proposals for award considerations

Participation in scientific meetings

Annual Research Symposium, Texas A&M University – Commerce, Moderator for oral presentation, 2011

A&M University System Pathways symposium, Texas A&M University, College Station, Poster Judging, 2011

A&M University System Pathways symposium, Texas A&M University, Galveston, Poster Judging, 2012

A&M University System Pathways symposium, Texas A&M University-Kingsville, Poster Judging, 2013

Federation of North Texas Area Universities Research Symposium, Texas Woman's University, Poster Judging, 2015

Annual Research Symposium, Texas A&M University – Commerce, Moderator for oral presentation, 2015

CLASSES DEVELOPED

BSc 254 and laboratory, General Microbiology for non-biology majors, course title and number inherited from previous instructor but entire course material has been newly built

BSc 306 and laboratory, Applied Microbiology for biology majors, course title and number inherited from previous instructor but entire course material has been newly built

BSc 428, Intro Medical Microbiology, newly built for biology majoring undergraduates

BSc 430, Virology, newly built for biology majoring undergraduates

BSc 497, Microbial Diversity, newly developed but taught only once at Fall, 2011

BSc 509, Microbial Ecology, newly built for online MS students

BSc 516, Medical Microbiology, newly built for online and face-to-face MS students
BSc 530, Advanced Virology, newly built for online MS students
BSc 550, Microbial Physiology, newly built for online MS students

AREAS OF EXPERTISE

Waste water treatment

Soil column development.
Molecular technique to monitor microbial population.
Simulating biofilm development on solid surface.

Fermentation

Biomass utilization for fuels and commodity chemicals production
Photobioreactor operation for bio-diesel production
Syngas fermentation
Bio-oil (pyrolysis oil) fermentation
Cultivation of microorganisms under controlled atmospheres (aerobic, micro-aerobic, and anaerobic)
Growth of microorganisms on gaseous substrates
Growth of microorganisms on volatile substrates
Chemostats
Batch, fed-batch, and continuous fermentation
Cell harvesting (centrifugation, tangential flow membrane filtration, hollow fiber membrane filtration)

Isolation and Characterization of Biomolecules

Bacterial enrichment and isolation
Isolation and characterization (protein, DNA, RNA, secondary metabolites)
Isolation under aerobic or anaerobic conditions
Isolation of soluble or membrane proteins
Chromatography (HPLC, MPLC, LPLC, GC, TLC)
Spectroscopy (UV-visible absorption, fluorescence, EPR, NMR, Circular dichroism, MS)
Electrophoresis (SDS-PAGE, IEF, agarose)

Other

Isothermal titration calorimetry
Light scattering
Kinetic (steady state and pre-steady state)
Oxygen electrode/sensor (Clark, OXELP, fluorescence)