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Education

Institution and Location	Degree & Date Conferred	Field of Study
Cornell University, Ithaca, NY	B.S., '78	Chemical Engineering
Rutgers University, Piscataway, NJ	M.S., '92	Chemical Engineering
Rutgers University, Piscataway, NJ	Ph.D., '95	Chemical Engineering

Professional Experience

2018 to present, University of Toledo, Associate Vice President for Research.
2017 to 2018, University of Toledo, Interim Associate Vice President for Research.
2010 to present, University of Toledo, Dept. of Chemical & Environmental Engineering, Toledo, OH, Professor and Graduate Director.
2010 to 2016, Graduate Director, Dept. of Chemical & Environmental Engineering.
2001 to 2010, University of Toledo, Dept. of Chemical & Environmental Engineering, Toledo, OH, Associate Professor.
2002-2007, Undergraduate Director, Dept. of Chemical & Environmental Engineering
1998 to 2001, University of Toledo, Dept. of Chemical & Environmental Engineering, Toledo, OH, Assistant Professor.
1995-1997, University of Tulsa, Dept. of Chemical Engineering, Tulsa, OK, Assistant Professor.
1992, Bristol Meyers Squibb; New Brunswick, NJ. Summer Intern in Pharmaceutics Research and Development.
1982-1987, Lederle Laboratories; Pearl River, NY. Project Engineer. Consultant from 1985 to 1987.
1980-1981, Soltex Polymer Corporation; Deer Park, TX. Production Engineer
1978-1980, Mobil Chemical Company, Phosphorus Division; Richmond, VA. Staff Engineer

Patents

U.S. patent # 8030030 B2, Priority date: Mar 14, 2007, S. Varanasi, C. Schall, A. P. Dadi, J. Anderson, K. Rao, P. Paripati, and G. Kumar, "Biomass Pretreatment", Patent Assignee: Univ of Toledo, Suganit Systems.

U.S. patents #8236536 B2; #7674608 B2, Priority date: Feb 23, 2007; S. Varanasi, C. Schall and A. P. Dadi, "Saccharifying cellulose", Patent Assignee: Univ of Toledo.

PCT/US2015/016019, Priority date: 2-16-15; C.A. Schall, S.V. Farahani, "Enhancement of lignocellulose saccharification via a low temperature ionic liquid pre-treatment scheme", Patent Assignee: Univ of Toledo

Refereed Publications (Corresponding author in bold)

Schall, C.A.; **Wiencek, J.M**.; Yarmush M.; Arnold, E. (1994) *Lysozyme crystal growth reduced at high pressure*, Journal of Crystal Growth, 135, 548-554.

Schall, C.A.;. Riley, J.S;. Li, E; Arnold, E.;. **Wiencek, J.M** (1996) *Application of temperature control strategies to the growth of hen egg-white lysozyme crystals*, Journal of Crystal Growth, **165**, 299-307.

Schall, C.A.; Arnold, E.;. **Wiencek, J.M** (1996) *Enthalpy of crystallization of hen egg-white lysozyme*, Journal of Crystal Growth, 165, 293-298.

Schall, C.A.; Wiencek, J.M. (1997) *Stability of Dihyro Nicotinamide Adenine Dinucleotide Immobilized to Cyanogen Bromide Activated Agarose*, Biotech. & Bioengineering, 53, 41-48.

Bhamidi, V.; Hanson, B.L.; Edmundson, A.; Skzypcak-Jankun, E; **Schall, C.A.** (1999) *The influence of a homologous protein impurity on lysozyme crystal growth*, J. of Crystal Growth**,** 204, 542-552.

Young, P., Dollimore, D.;. **Schall, C.A** (2000) *Thermal analysis of solid-solid interactions in binary mixtures of alkylcyclohexanes using differential scanning calorimetry*, J. of Thermal Analysis, 62, 163-175.

Young, P.; **C.A. Schal**l, (2001) *Cycloalkane solubility determination through differential scanning calorimetry*, Thermochimica Acta 367-368, 387-392.

Bhamidi, V.; Skrzypczak-Jankun, E.; **Schall, C.A.** (2001) *Dependence of nucleation kinetics and crystal morphology of a model protein system on ionic strength*, J. of Crystal Growth, 232, 77-85.

Cordoba, A.J.; **C.A**.**Schall,** (2001) *Application of a heat transfer method to determine wax deposition in a hydrocarbon mixture*, Fuel 80, 1285-1291.

Cordoba, A.J.; **C.A Schall**,. (2001) *Solvent migration in a paraffin deposit*, Fuel 80, 1279-1284.

Bhamidi, V.; Varanasi, S.; **Schall, C.A.**, (2002) *Measurement and modeling of protein crystal nucleation kinetics*, *Crystal Growth & Design*, 2(5), 395-400

Hanson, B. L.; Harp, J. M.; Kirschbaum, K.; Schall, C. A.; DeWitt, K.; Howard, A.; Pinkerton, A. A.; Bunick, G. J. (2002) *Experiments Abating Radiation Damage with Cryogenic Helium. J. Synchrotron Rad.* 9: 375-381.

Hanson, B.L., Schall, C.A., **Bunick, G.J.** (2003) *New techniques in macromolecular cryocrystallography: Macromolecular crystal annealing and cryogenic helium*. J. Struct. Biol. 142: 77-87.

Chinte, U., Shah, B., DeWitt, K., Kirschbaum, K., Pinkerton, A.A., **Schall, C.**, (2005), *Sample size: an important parameter in flash-cooling macromolecular crystallization solutions*, J. Applied Crystallography, 38(3), 412-419.

Schall, C., Chinte, U., Shah, B., Hanson, B.L., *Effect of crystal size and cooling method on cryoprotection and data quality*, (2005). Acta Cryst. A61, C9

Chinte, U., Hanson, L., Pinkerton, A., **Schall, C.**, *Mitigation of radiation damage to protein crystals using a helium cryostream*, (2005). Acta Cryst. A61, C229

Bhamidi, Venkateswarlu; Varanasi, Sasidhar; **Schall, Constance A.** (2005). *Protein crystal nucleation: Is the pair interaction potential the primary determinant of kinetics?* Langmuir, 21(20), 9044-9050.

Escobar, I, M. Pickett, C. Schall, M. Coleman, (2006) *Engineering for teachers of migrant students (ETMS)*, Environmental Engineering Science 23(3), 472-478.

B. Shah, **C.A. Schall**, (2006) *Measurement and modeling of the glass transition temperatures of multi-component solutions*, Thermochimica Acta, 443, 78-86.

Izaac, A.,C.A. Schall and **T. C. Mueser** (2006) *Assessment of a preliminary solubility screen to improve crystallization trials: uncoupling crystal condition searches*, Acta Crystallographica Section D: Biological Crystallography D62, 833-842.

Dadi, A. P., S. Varanasi, **C. A. Schall** (2006) *Enhancement of cellulose saccharification Kinetics using an ionic liquid pretreatment step*, Biotechnology and Bioengineering, 95(5), 904-910.

Chinte, Unmesh; B, Shah,Yu Sheng Chen, Yu Sheng; A. A. Pinkerton, **C. A. Schall**, B. L. Hanson, *Cryogenic (<20 K) helium cooling mitigates radiation damage to protein crystals.* Acta Crystallographica, Section D: Biological Crystallography (2007), D63(4), 486-492.

Dadi, A., C.A. Schall, **S.Varanasi**, (2007) *Mitigation of cellulose recalcitrance to enzymatic hydrolysis by ionic liquid pretreatment*, Applied Biochemistry and Biotechnology, 136-140, 407-421.

Gosavi, Rajendrakumar A.; Mueser, Timothy C.; **Schall, Constance A**., *Optimization of buffer solutions for protein crystallization*. Acta Crystallographica, Section D: Biological Crystallography (2008), D64(5), 506-514.

Zhao, Fei; Thehazhnan K. Ponnaiyan, Christa M. Graham, Constance A. Schall, Sasidhar Varanasi, **Jared L. Anderson**, (2008) *Determination of ethanol in ionic liquids using headspace solid-phase microextraction–gas chromatography*, Anal. Bioanal. Chem., DOI 10.1007/s00216-008-2398-9.

Gosavi, R. A.; V. Bhamidi, S. Varanasi and **C. A. Schall**, (2009) *Beneficial Effect of Solubility Enhancers on Protein Crystal Nucleation and Growth*, Langmuir, 25(8), 4579-458.

Schutt, K.; D. White, R.A Gosavi, **C. A. Schall**, (2009) *The Distribution of Impurities in Lysozyme Crystals*, J. Crystal Growth, 311(16), 4062-4068.

Samayam, Indira P., **C.A. Schall** (2010) Saccharification of ionic liquid pretreated biomass with commercial enzyme mixtures, Bioresource Technology 101,3561–3566.

Lucas, M.; G. L. Wagner, Y. Nishiyama, L. Hanson, I.P. Samayam, C.A. Schall, P. Langan, K.D. Rector, (2011) *Reversible swelling of the cell wall of poplar biomass by ionic liquid at room temperature*, Bioresource Technology 102(6), 4518-4523.

Shah, Binal N.; Chinte, Unmesh; Tomanicek, Stephen J.; Hanson, B. Leif; **Schall, Constance A**, *Flash Cooling Protein Crystals: Estimate of Cryoprotectant Concentration Using Thermal Properties* , Crystal Growth & Design (2011), 11(5), 1493-1501.

Samayam, I.P.; B.L. Hanson, P. Langan, **C.A. Schall**, *Ionic-liquid-induced changes in cellulose structure associated with enhanced biomass hydrolysis*, Biomacromolecules (2011). 12(8), 3091-3098.

Barr, C.J.; J.A. Mertens, **C. A. Schall**, *Critical cellulase and hemicellulase activities for hydrolysis of ionic liquid pretreated biomass*, Bioresource Technology (2012), 104, 408-485.

Amber L. Milliren; J.C. Wissinger; V.Gottumukala: **C. A. Schall**, *Kinetics of soybean oil hydrolysis in subcritical water*, Fuel, (2013), 108, 277-281.

Christopher J. Barr, B. Leif Hanson, Kevin Click, Grace Perotta, **Constance A. Schall**, *Influence of ionic-liquid incubation temperature on changes in cellulose structure, biomass composition, and enzymatic digestibility*, Cellulose (2014), 21: 973-982, DOI 10.1007/s10570-013-0052-y.

SamiraVasheghani Farahani, Yong Wah Kim, **Constance A. Schall**, *A coupled low temperature oxidative and ionic liquid pretreatment of lignocellulosic biomass*, Catalysis Today (2016), 269, 2–8.

Book Chapter
Schall, C.A., Wiencek, J.M. (1997) *Chapter 8: Product Recovery and Purification via Precipitation and Crystallization*, Handbook of Downstream Processing, E. Goldberg, ed., Chapman & Hall.

Sponsored Research (PI unless otherwise noted):

2017-2019	*Microgravity Crystal Growth for Improvement in Neutron Diffraction and the Analysis of Protein Complexes*, (Co-investigator, PI- T. Mueser) The Center for the Advancement of Science in Space, Inc., $363,390
2013-2015	*Optimization of Protein Crystal Growth for Determination of Enzyme Mechanisms through Advanced Diffraction Techniques,* (Co-investigators, T. Mueser, D. Ronning, B.L. Hanson), The Center for the Advancement of Science in Space, Inc., GA-2013-117, $200,000
2009-2014	*A facile pretreatment strategy for recovering sugars and lignin effectively from a variety of lignocellulosic feedstocks*, (Co-investigator) The National Science Foundation, $305,000.
2009-2012	*MRI-R2: Acquisition of a suite of analytical instrumentation essential for investigating fuel, chemical and polymer production from biomass*, (Co-investigator) The National Science Foundation, $992,690.
2009-2012	*Center for Algal Engineering Research and Commercialization*, Third Frontier Commission, Wright Capital Project, Ohio Dept. of Development, Total Award: $2,970,063, Co-investigator on UT subcontract from Ohio University ($1,000,000).
2009-2011	*Processing of Algal Feedstocks for Fuels*, The Center for Innovative Food Technology, $158,600
2009-2010	*Acquisition of a Matrix-Assisted Laser Desorption/Ionization Tandem Time-of-Flight Mass Spectrometer*, (Co-investigator) The National Science Foundation, $449,750
2009-2011	*Scale-up of Cellulosic Ethanol Process Based on Novel Biomass Pretreatment and Efficient Co-Fermentation*, OH Department of Development, Advanced Energy Program, $450,000, Co-investigator on UT subcontract from SuGanit Systems (total award $1,000,000).
2008-2009	*An Efficient Approach for Saccharification of Cellulose from Biomass for Fuel/Chemical Productio*n, The Consortium for Plant Biotechnology Research, $78,000

Courses Taught
University of Toledo
CHEE 2230 Chemical Engineering Thermodynamics I
CHEE 3110 Process Heat Transfer
CHEE 4110 Green Engineering Applications
CHEE 4520 Chemical Process Economics and Design
CHEE 4540 Chemical Process Simulation & Design

CHEE 1010 Professional Development
CHEE 3030 Separations
CHEE 3300 Reactor Design
CHEE 2010 Mass and Energy Balances
CHEE 5930 Chemical Engineering Seminar
CHEE 6110/8110 Green Engineering Applications
CHEE 6510/8510 Advanced Chemical Engineering Thermodynamics
CHEE 6510/8510 New Separations (co-taught)
CHEE 6500/8500 Advanced Chemical Reaction Engineering

University of Tulsa
Chemical Reactor Design
Mass Transfer
Engineering Thermodynamics I
Chemical Engineering Problem Solving

Honors and Awards

- Dupont Young Professor Grant, 1997-2000
- NASA - ASEE Summer Faculty Fellowship, 1997
- American Association of University Women Selected Professions Dissertation Fellowship, 1995
- NASA Graduate Research Fellow, 1994-1995
- National Institute of Health Fellow, Rutgers/UMDNJ Ph.D. Training Program in Biotechnology, 1990-1993
- Recipient of G.E. Foundation Teaching Incentive Grant, 1994