Christopher L. Wirth

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Research Interests

Colloid and Interface Science, Electrokinetics, Soft Matter

Appointments

2014 to present, **Assistant Professor**
Chemical and Biomedical Engineering Department
Washkewicz College of Engineering
Cleveland State University

2013 – 2014, **Postdoctoral Scholar**
Department of Chemical Engineering
Soft Matter, Rheology, and Technology Laboratory
KU Leuven, Belgium
Mentors: Jan Vermant and Michael De Volder

2012, **Research Engineer**
Automotive Coatings - Insight Group
PPG Industries
Mentors: Kevin Gallagher (PPG) and Shelley Anna (CMU)

Education

2012, PhD in Chemical Engineering
Carnegie Mellon University
Advisors: Dennis C. Prieve and Paul J. Sides

2007, BS in Chemical Engineering
School of Engineering and Applied Sciences
University at Buffalo, The State University of New York

Honors and Awards

2018 CSU Faculty Merit Recognition Award
2018 National Science Foundation CAREER Award
2017 American Chemical Society Doctoral New Investigator Award
2012 Ken Meyer Award for Excellence in Graduate Research
2012 Robert R. Rothfus Graduate Fellowship
2011 Roy W. Weiland Graduate Fellowship
2011 Carnegie Institute of Technology Bertucci Graduate Fellowship
2009 Elected President of the Chemical Engineering Graduate Student Association
2007 Achievement Rewards for College Scientists Scholarship
2007 National Science Foundation Graduate Fellowship (honorable mention)

Professional Service

2018 **Chair**, AIChE Annual Meeting "Soft Matter Electrokinetics"
2018 **Co-Chair**, AIChE Annual Meeting "Active Colloids"
2018 **Co-Chair**, 92nd ACS Colloids and Surface Science Symposium, "Colloidal and Surface Forces"
2017 - **NSF REU Mentor**, REU: Synthesis, Assembly and Characterization of Soft Matter Systems, Cleveland State University Department of Physics
2017 **Chair**, American Institute of Chemical Engineers Annual Meeting (AIChE) Annual Meeting "In of Honor of Dennis Prieve's Retirement – 1 & 2"
2017 **Chair**, AIChE Annual Meeting "Active Colloidal Systems"
2017 **Co-Chair**, AIChE Annual Meeting "Emulsions and Foams"
2016 **Chair**, American Institute of Chemical Engineers Annual Meeting (AIChE), "Soft Matter Electrokinetics: Particles, Drops, and Bubbles"
2016 **Chair**, AIChE Annual Meeting "Active Colloidal Systems 1"
2016 **Co-Chair**, AIChE Annual Meeting "Emulsions and Foams"
2015 **Chair**, AIChE Annual Meeting "Soft Matter Electrokinetics: Particles, Drops, and Bubbles"
2015 **Panelist**, AIChE Annual Meeting Young Professionals Panel
2015 **Co-Chair**, 89th ACS Colloids and Surface Science Symposium Poster Session
2015 **Judge**, Choose Ohio First Poster Session
2015 - **Proposal Reviewer** for *NASA, ACS, and NSF*.
2014 **Judge**, AES/AIChE Annual Meeting Poster Session
2014 **Co-Chair**, AIChE Annual Meeting "Soft Matter Electrokinetics: Particles, Drops, and Bubbles"
2014 **Meeting Chair**, The Gordon Research Seminar on Colloidal, Macromolecular, and Polyelectrolyte Solutions
2013 **Instructor**, 14th European School on Rheology
2013 **Co-Chair**, AIChE Annual Meeting "Electrokinetic behavior of Micro- and Nano-Particles: Directed Assembly Under Electric Fields"
2013 **Judge**, AES/AIChE Annual Meeting Poster Session
2012 - **Reviewer** for *Physical Review E, Industrial and Engineering Chemistry Research, Langmuir, Electrophoresis, Colloids and Surfaces A, Soft Matter, Biomicrofluidics, Energy and Fuels, Micromachines, and Materials.*
2012 **Chair**, AIChE Annual Meeting "Electrokinetic behavior of Micro- and Nano-Particles: Directed Assembly Under Electric Fields"
2012 **Judge**, AES/AIChE Annual Meeting Poster Session

Journal Articles, Book Chapters, and Conference Proceedings

*Under review/in preparation, *CSU student*

18) **Aqueous Dispersion and Self-Assembly of Boron Nitride Nanotubes by DNA;** VR Kode*, ME Thompson, C McDonald*, J Weicherding, T Dobrila, PS Fodor, CL Wirth, G Ao
17) **Microstructure, aggregation kinetics, and standing of colloidal ellipsoids near an ac electrode;** J. Yan*, A Rashidi*, and CL Wirth
16) **Influence of cap weight on the motion of a Janus particle very near a wall**; A Rashidi*, S Razavi, and CL Wirth

15) **Depletion quenches the locomotion of active Janus particles**; MW Issa*, NR Baumgartner*, SD Ryan, and CL Wirth

Journal Articles, Book Chapters, and Conference Proceedings

*Published, *CSU student*

14) **Local measurement of Janus particle cap thickness**; A Rashidi*, MW Issa*, I Martin, A Avishai, S Razavi, and CL Wirth, *ACS Applied Materials and Interfaces (2018)* 10 (37), 30925 - 30929
13) **Combined effect of surface oxidation and residual alcohol on the mechanics of a multiwall carbon nanotube laden interface**; WD Ivancic* and CL Wirth, *Colloids and Surfaces A: Physicochemical and Engineering Aspects (2018)* 551, 42 - 49
12) **Motion of a Janus particle very near a wall**; A Rashidi* and CL Wirth, *Journal of Chemical Physics* (2017) 147, 224906
11) **Response of a doublet to a nearby dc electrode of uniform potential**; CL Wirth and Sri Harsha Nuthalapati*, *Physical Review E* (2016) 94, 042614
10) **Langmuir monolayer characterization via polymer microtensiometers**; P Gijsenbergh, M Pepicelli, CL Wirth, J Vermant and R Puers, *Sensors & Actuators: A. Physical (2015) 229, 110 – 117*
9) **Fabrication of planar colloidal clusters with template-assisted interfacial assembly**; CL Wirth, MFL De Volder, and J Vermant, *Langmuir* (2015) 31, (5), 1632 - 1640.

Publications above after appointment at CSU

8) **A polymer microdevice for tensiometry of insoluble components**; P Gijsenbergh, M Pepicelli, CL Wirth, J Vermant and R Puers, *Procedia Engineering* (2014) 87, 80 – 83
7) **Weak electrolyte dependence in the repulsion of colloids at a water-oil interface;** CL Wirth, EM Furst and J Vermant, *Langmuir* (2014) 30, (10), 2670 - 2675.
6) **Electrolyte dependence of particle motion near an electrode during ac polarization**; CL Wirth, PJ Sides and DC Prieve, *Physical Review E* (2013) 87, 032302
5) **Mechanisms for directed assembly of colloidal particles in two dimensions by application of electric fields;** PJ Sides, CL Wirth and DC Prieve. in Electrophoretic Deposition of Nanomaterials, 3-72. Eds. JH Dickerson and AR Boccaccini. Springer, 2012.
4) **Single and pairwise motion of particles near an ideally polarizable electrode**; CL Wirth, RM Rock, PJ Sides and DC Prieve, *Langmuir* (2011) 27, (1), 9781-9791.
3) **The imaging ammeter;** CL Wirth, PJ Sides, DC Prieve, *Journal of Colloid and Interface Science* (2011) 357, (1), 1-12.
2) **An imaging ammeter for electrochemical measurements**; PJ Sides, CL Wirth, DC Prieve, *Electrochemical and Solid-State Letters* (2010) 13, (8), F10-F12.
1) **2D assembly of colloidal particles on a planar electrode**; DC Prieve, PJ Sides, CL Wirth, *Current Opinion in Colloid & Interface Science* (2010) 15, (3), 160-174.

Selected Presentations

*Since 08/2014, $invited, @peer reviewed abstract, &poster, *CSU student*

16) **Dynamics of colloidal particles in a fluid: Applications in rheology and surface force measurement$**
CL Wirth; Sherwin Williams, September 2018

15) **The motion of a Janus particle very near a wall** [$]
A Rashidi* and CL Wirth; Chemical Engineering Department, Colloids, Polymers, and Surfaces Seminar, Carnegie Mellon University, November 2017

14) **Brownian dynamics of a spherical Janus particle near a boundary as a tool to investigate TIRM** [$]
A Rashidi* and CL Wirth; Chemical and Biomolecular Engineering Department, Complex Fluids Engineering Seminar, University of Pennsylvania, June 2017

13) **Brownian dynamics of a spherical Janus particle near a boundary as a tool to investigate TIRM**[$]
A Rashidi* and CL Wirth; Chemical Engineering Department, Complex Fluids Engineering Seminar, Lehigh University, June 2017

12) **Total Internal Reflection Microscopy of a Janus Sphere**[$]
A Rashidi* and CL Wirth; Chemical and Biomolecular Engineering Department, University of Toledo, April 2017

11) **In Silico Total Internal Reflection Microscopy of a Janus Sphere with Brownian Dynamics Simulations** [$]
A Rashidi* and CL Wirth; Bremen Workshop on Light Scattering, Universität Bremen (Germany), February 2017

10) **Total Internal Reflection Microscopy of a Janus Sphere**[$]
A Rashidi* and CL Wirth; Chemical and Biomolecular Engineering Department, Ohio University, February 2017

9) **The Response of an Anisotropic Colloid to a Nearby DC Electrode**[@,&]
SH Nuthalapati*, C Obasanjo*, and CL Wirth; AIChE Annual Meeting, San Francisco, CA, November 2016

8) **Simulating Total Internal Reflection Microscopy of Anisotropic Particles**[@,&]
A Rashidi* and CL Wirth; AIChE Annual Meeting, San Francisco, CA, November 2016

7) **Scalable Assembly of Nanoparticles onto Templated Substrates**[&]
J Juchnowski*, JE Bickel, and CL Wirth; AIChE Annual Meeting, San Francisco, CA, November 2016

6) **The Advanced Nanomaterials and Colloids Lab**[$]
CL Wirth; PPG Industries, August 2016

5) **The Response of Colloidal Doublets to a Nearby DC Electrode**[@, &]
CL Wirth and SH Nuthalapati; Gordon Research Conference in Colloidal, Macromolecular, and Polyelectrolyte Solutions, Ventura, CA, February 2016

4) **The Response of an Anisotropic Colloid to a Nearby DC Electrode**[@]
CL Wirth; AIChE Annual Meeting, Salt Lake City, UT, November 2015

3) **The Response of an Anisotropic Colloid to a Nearby DC Electrode**[@]
CL Wirth; ACS Colloids Symposium, Pittsburgh, PA, June 2015

2) **The Advanced Nanomaterials and Colloids Lab**[$]
CL Wirth; Sherwin-Williams, February 2015

1) **Directed Assembly of Isotropic and Anisotropic Colloidal Particles**[$]
CL Wirth; Chemical and Biomolecular Engineering Department, Case Western Reserve University, March 2015

Students Supervised as Research Advisor

Doctoral students:

29) **Dustin Bowden**, PhD with specialization in Chemical Engineering (currently enrolled)
28) **Jiarui Yan**, PhD with specialization in Chemical Engineering (currently enrolled)
27) **Selwin Varghese**, PhD with specialization in Chemical Engineering (currently enrolled)
26) **Aidin Rashidi**, PhD with specialization in Chemical Engineering (currently enrolled)

Masters students:

25) **Sri Harsha Nuthalapati**, MS Thesis in Chemical Engineering (graduated spring 2018)
24) **Kevin Gardella**, MS in Physics (currently enrolled)
23) **Mohammed Khalil**, MS Thesis in Chemical Engineering (currently enrolled)
22) **Michael March**, MS Project in Chemical Engineering (currently enrolled)
21) **Nicholas Turner**, MS Project in Chemical Engineering (graduated fall 2015)
20) **Cornelius Obasanjo**, MS Thesis in Chemical Engineering (graduated fall 2016)
19) **Selwin Varghese**, MS Thesis in Chemical Engineering (graduated fall 2017)
18) **Venkateswara Rao Kode**, MS Project in Chemical Engineering (graduated spring 2017)
17) **Mehul Gamara,** MS Project in Chemical Engineering (graduated fall 2017)
16) **William Ivancic**, MS Thesis in Chemical Engineering (graduated fall 2017)
15) **Jiarui (Gary) Yan**, MS Thesis in Chemical Engineering (graduated in summer 2018)
14) **William Tuttle**, MS Project in Chemical Engineering (graduated spring 2017)

Undergraduate students:

13) **Sarah Buchahine**, BS in Chemical Engineering (Honors, currently enrolled)
12) **Kenneth Gregg**, BS in Physics (University of Akron)
11) **Naik Yusifi**, BS in Chemical Engineering (currently enrolled)
10) **Marissa Trivisonno**, BS in Chemical Engineering (currently enrolled)
9) **Marola Issa**, BS in Chemical Engineering (currently enrolled)
8) **TJ Markiewicz**, BS in Biomedical Engineering (Rowan University)
7) **Payton Lewis**, BS in Chemical Engineering (Honors, graduated spring 2018)
6) **Nandini Padaraju**, BS in Chemical Engineering (currently enrolled)
5) **John Juchnowski,** BS in Chemical Engineering (graduated spring 2017)
4) **Jason Wolf**, BS in Mechanical Engineering (graduated fall 2015)
3) **Ian Burns**, BS in Mechanical Engineering (currently enrolled)
2) **Richard Schmitt**, BS in Chemical Engineering (graduated spring 2016)
1) **William Ivancic**, BS in chemical engineering (graduated spring 2016)

Students Supervised as Committee Member

9) **Jeremy Loss**, MS BME Thesis (currently enrolled)
8) **Kara Ufuoma**, MS ChemE Thesis (graduated summer 2018)
7) **Kevin Otto**, MS ChemE Thesis (graduated spring 2015)
6) **Tara Diba**, MS BME Thesis (graduated fall 2015)
5) **James Deyling**, MS ChemE Thesis (graduated fall 2016)
4) **Aaron Moran**, DRE ChemE (graduated 2018)
3) **Richard Schmitt**, MS ChemE (graduated 2018)
2) **Supriya Upadyay**, MS ChemE (graduated 2018)
1) **Claudine Lacdao**, MS ChemE (graduated 2017)

Courses Taught ($new course)

6) $**CHE650/BME650:** ChBME Department Seminar (spring 18, fall 18)
5) **ESC720:** Research Communications (fall 17, fall 18)
4) $**CHE444/544:** Colloidal and Interfacial Phenomena (fall 14, fall 16, fall 18)
3) **CHE506:** Advanced Transport Phenomena (spring 16, spring 18)
2) **ESC301:** Fluid Mechanics (summer 15, spring 17, spring 18)
1) $**CHE594/694:** Colloidal Hydrodynamics and Electrokinetics (fall 15)

Outreach

1) **Everyday Nano** Program seeking to have high school students learn about the broad area of Colloid and Interfacial Science and subsequently focus effort on learning about one specific product that students interact with on a daily basis. The initial offering of the program in August 2016 was held at MC^{2}STEM high school. MC^{2}STEM is a Cleveland Metropolitan School District (CMSD) high school with its 11th and 12th grade campus located at Cleveland State University. The MC^{2}STEM curriculum is structured around providing students with interdisciplinary and hands-on learning experiences, via group projects and internships

External Research Support

4) **Amount:** $500,000
Agency: National Science Foundation
Title: CAREER: Interrogating dense anisotropic colloidal suspensions with SMR-TIRM (Role: PI)
Duration: September 1st, 2018 – August 31st, 2023

3) **Amount:** $61,181
Agency: PPG Industries
Title: Development of a Particle Based Non-Invasive Inspection Technique for Paint – Phase II (Role: PI)
Duration: January 1st, 2018 – December 31st, 2018

2) **Amount:** $110,000
Agency: American Chemical Society Petroleum Research Foundation
Title: Microstructure and Transport of Nanoparticle Laden Foams in Porous Media (Role: PI)
Duration: September 1st, 2017 – August 31st, 2019

1) **Amount:** $59,710
Agency: PPG Industries
Title: Development of a Particle Based Non-Invasive Inspection Technique for Paint – Phase I (Role: PI)
Duration: January 1st, 2017 – December 31st, 2017

University Service

19) **College of Engineering Diversity Committee** (fall 2018-)
18) **ChBME Qualifier Committee**, (fall 2018-)
17) **Textbook Adoption Committee,** (spring 2018)
16) **Search Committee,** Lecturer (spring – summer 2015)
15) **Search Committee,** Advancement Officer (fall 2015 – spring 2016)
14) **Search Committee,** AVP for Research (spring 2016)
13) **ESC120 Curriculum Committee** (spring – summer 2015)
12) **Dean's Ad-hoc Committee** (spring – summer 2015)
11) **Graduate Student Award Review Committee** (spring 2016)
10) **Department Secretary** (fall 2014 - spring 2016)
9) **Bell Lectureship/Seminar Series Planning Committee** (fall 2016 - present)
8) **University Research Council** (fall 2016 - present)
7) **Patent Review Committee** (fall 2016 - present)
6) **Retreat Planning** (August 2015 & 2016)
5) **New Engineering Building Renovation Sub-Group** (fall 2014)
4) **College of Engineering Research Working Group** (fall 2016)
3) **College of Engineering Graduate Student Working Group** (fall 2015 – spring 2016)
2) **Engineering Student Recruitment Committee** (spring 2015)
1) **Reviewer for Undergraduate Research Award** (spring 2016)