**Jules J. Magda**

*Professor of Chemical Engineering* **Telephone:** (801) 581-7536

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**PROFESSIONAL PREPARATION**

Stanford University, Stanford, California Chemical Engineering B.S. in 1979

University of Minnesota, Minneapolis, MN Chemical Engineering PhD in 1986

AT&T Bell Laboratories, Murray Hill, NJ Polymer Research Postdoc. 1986-1988

**APPOINTMENTS**

2011-current Professor, Department of Chemical Engineering, University of Utah, Salt Lake City, UT,USA

1995-2011 Associate Professor, Department of Chemical Engineering and Department of Materials Science & Engineering, University of Utah, Salt Lake City, UT, USA

1988-1995 Assistant Professor, Department of Chemical Engineering and Department of Materials Science & Engineering, University of Utah, Salt Lake City, UT, USA

**COURSES TAUGHT 2016- 2020**

ChEN 4903 – Senior Project Labs in Chemical Engineering (5 times)

ChEN 6553 – Chemical Reaction Engineering (4 times)

ChEN 7960 – Structure & Rheology of Complex Fluids (1 time)

**CURRENT RESEARCH PROJECTS**

Synthesis of smart polymer hydrogels for use in point-of-care sensors for detecting Zika and Covid-19 virus particles. Synthesis of smart polymer hydrogels for use in continuous in-line sensors for monitoring growth medium conditions in bioreactors. Synthesis of smart polymer hydrogels for use in sensors used to monitor dopamine concentration and fentanyl concentration. Microfluidic sensors and the effect of nanoscale confinement upon the flow of polymer solutions in nanopores. Rheology and modelling of waxy crude oil emulsions in oil transportation pipelines.

## RESEARCH SUPPORT (last 5 years)

United States Department of Army (sub-contract) Magda (PI) 9/1/20 – 8/30/21

*Multi-Analyte In-Line Sensor for Biomanufacturing Applications Based on Analyte-Responsive Smart Hydrogels*

The goal of this project is to develop smart hydrogel-based sensors for monitoring growth medium conditions in bioreactors producing stem cells.

Role: Principal investigator

National Science Foundation Tabib-Azar (PI) 5/15/20 – 4/30/21

*RAPID: Colorimetric COVID-19 Detection Using Aptamers*

The goal of this project is to synthesize and test novel stimuli-responsive hydrogels containing DNA aptamers to be used as recognition elements for point of care COVID-19 sensors

Role: Co-investigator

National Science Foundation Tabib-Azar (PI) 5/15/19 – 4/30/21

*EAGER: Colorometric Detection of Zika and other Viruses Through Their Surface Proteins*

The goal of this project is to synthesize and test novel stimuli-responsive hydrogels containing DNA aptamers to be used as recognition elements for point of care Zika virus sensors

Role: Co-investigator

National Institute of Health Kuck (PI) 9/16/19 – 3/15/2021

*STTR: Continuous real-time fentanyl sensor platform based on smart hydrogels for application in anesthesia*

The goal of this project is to synthesize and test novel stimuli-responsive hydrogels containing DNA aptamers to be used as recognition elements in implantable sensors for monitoring fentanyl concentration during surgery.

Role: Co-investigator

Department of Energy – Basic Energy Science Butt (PI) 8/1/18 – 7/31/22

*Multi-scale Fluid Solid Interactions in Architected and Natural Materials*

The goal of this project is to study the effect of confinement in nanopores upon fluid properties

Role: Co-Investigator

United States Department of Agriculture Chen (PI) 9/1/15 – 9/1/20

*Future Hispanic Engineers*

The goal of this project was to train Hispanic undergraduate engineers in sensor research.

Role: Co-Investigator

Chevron Energy & Technology Company Deo (PI) 8/1/15 – 8/1/20

*Rheology of Waxy Crude Oil Emulsions and the Effectiveness of Pour Point Depressants*

The goal was to study additives used to improve the flow of waxy crude oil emulsions in pipelines.

Role: Co-Investigator

University of Utah Research Foundation S. Mohanty ( PI) 1/1/16 – 12/31/16

*Nanotube-Coupled Sensors*

The goal was to use DNA aptamers as molecular recognition elements attached to nanotubes for sensing applications

Role: Co-Investigator

University of Utah Research Foundation Yunshan Wang( PI) 1/1/20 – 1/1/21

*Label-Free Detection of Dopamine Using UV Plasmonics*

The goal is to develop aptamer-based hydrogels for detection of dopamine

Role: Co-Investigator

**PUBLICATIONS**

**Co-author of over 100 peer-reviewed publications, 5527 total citations, h-index = 38 (Google Scholar)**

***Peer-Reviewed Publications 2016 - 2020 (10 in total given in reverse chronological order; the three most significant are highlighted in red):***

1. Farhoudi, Navid, Hsuan-Yu Leu, Lars B. Laurentius, Jules J. Magda, Florian Solzbacher, and Christopher F. Reiche. "Smart Hydrogel Micromechanical Resonators with Ultrasound Readout for Biomedical Sensing." *ACS Sensors* 5, no. 7 (2020): 1882-1889.
2. Wang, Yichen, Jules Magda, Ramachandran Venkatesan, Krishnaraj Sambath, and Milind Deo. "Experimental and Theoretical Investigations of Waxy Crude Oil in Steady and Transient Pipe Flows." *Industrial & Engineering Chemistry Research* 59 (2020) : 13783 - 13798.
3. Feng, Haidong, Jules John Magda, and Bruce Kent Gale. "Viscoelastic second normal stress difference dominated multiple-stream particle focusing in microfluidic channels." *Applied Physics Letters* 115, no. 26 (2019): 263702.
4. Wang, Yichen, Jules Magda, Ramachandran Venkatesan, and Milind Deo. "Effect of Emulsified Water on Gelled Pipeline Restart of Model Waxy Crude Oil Cold Flows." *Energy & Fuels* 33, no. 11 (2019): 10756-10764.
5. Dolai, Subhashish, Hsuan-Yu Leu, Jules Magda, and Massood Tabib-Azar. "Bio-mimetic synthetic cell hydrogel magnetometer." *Bioinspiration & Biomimetics* 14, no. 2 (2019): 026003.
6. Leu, Hsuan-Yu, Navid Farhoudi, Christopher F. Reiche, Julia Körner, Swomitra Mohanty, Florian Solzbacher, and Jules Magda. "Low-Cost Microfluidic Sensors with Smart Hydrogel Patterned Arrays Using Electronic Resistive Channel Sensing for Readout." *Gels* 4, no. 4 (2018): 84.
7. Nguyen, Tram, Prashant Tathireddy, and Jules J. Magda. "Continuous hydrogel-based glucose sensors with reduced pH interference and contact–free signal transduction." *IEEE Sensors Journal* 19, no. 6 (2018): 2330-2337.
8. Nguyen, Tram, Jules J. Magda, and Prashant Tathireddy. "Manipulation of the isoelectric point of polyampholytic smart hydrogels in order to increase the range and selectivity of continuous glucose sensors." *Sensors and Actuators B: Chemical* 255 (2018): 1057-106
9. Dolai, Subhashish, Hsuan-Yu Leu, Jules Magda, and Massood Tabib-Azar. "Hydrogel Gold Nanoparticle Switch." *IEEE Electron Device Letters* 39, no. 9 (2018): 1421-1424.
10. Fawole, Olutosin Charles, Subhashish Dolai, Hsuan-Yu Leu, Jules Magda, and Massood Tabib-Azar. "Remote microwave and field-effect sensing techniques for monitoring hydrogel sensor response." *Micromachines* 9, no. 10 (2018): 526.

## REFEREED CONFERENCE PUBLICATIONS (Last 5 years)

Farhoudi, Navid, Jules J. Magda, Florian Solzbacher, and Christopher F. Reiche. "Fabrication Process for Free-Standing Smart Hydrogel Pillars for Sensing Applications." In *2020 IEEE Sensors*, pp. 1-4. IEEE, 2020.

S. Dolai & H.-Y. Leu, J. Magda, M. Tabib-Azar (2018). Metal-Oxide-Hydrogel Field-Effect Sensor. IEE Xplore. Article, Refereed Conference Proceedings, Published, 12/01/2018.

Julia Koerner, C.F. Reiche, H.-Y. Leu, J. Magda (2018). Fast-Reacting Smart Hydrogel-Based Sensor Platform for Biomedical Applications. TechConnect Briefs, Article, Refereed Conference Proceedings, Published, 06/01/2018.

## INVITED ORAL PRESENTATIONS (Last 5 years)

"Polymer Hydrogels: A Biocompatible Material with Multiple Potential Uses in Single-Use Sensors", presented at Single-Use Technologies III: Scientific and Technological Advancements, Snowbird, Utah. Invited Talk/Keynote, Presented, 09/24/2018.

“Single-use Sensor Array for Monitoring Key Growth Medium Analytes During mAbs Biomanufacturing”, AIChE Topical Conference on Chemical Engineering in Medicine, AIChE National Meeting, Minneapolis, MN. Invited Talk/Keynote, Presented, 10/31/2017.

“Biomed Biosensors for Pharma”, Renaissance Weekend, Park City, Utah. Invited Talk/Keynote Presented 07/03/2017.

**CONFERENCE PRESENTATIONS (Last 5 years)**

2020

Farhoudi, Navid, Jules J. Magda, Florian Solzbacher, and Christopher F. Reiche. "Fabrication Process for Free-Standing Smart Hydrogel Pillars for Sensing Applications." *2020 Conference of IEEE Sensors (virtual)*, October 25-28, 2020.

Farhoudi, Navid, Lars B. Laurentius, Christopher F. Reiche, Jules Magda, and Florian Solzbacher. "Micromechanical Resonators for Ultrasound-Based Sensors." In *ECS Meeting Abstracts*, no. 31, p. 2328. IOP Publishing, 2020.

"In-Situ Synthesis and Characterization of Mesoporous SBA-15 inside Enclosed Polymer Microchannels", L. McKinnon, H. Cho, B. Wang, J. Magda, M. Bartl, S. Mohanty, M.Deo, presented at the 2019 AIChE Annual Meeting. Other, Presented, 11/11/2019.

“Transportation of Waxy Crude Oils: Restart of Flow in Pipelines Blocked with Wax Gels and Predictions Using Laboratory Tests”, Y. Wang, J. Magda, R. Venkatesan, M. Deo, presented at the 5th Annual Conference on Production Chemicals Optimization, Houston, TX, 06/26/2019.

"A Biomedical Sensor Based on Resonant Absorption of Ultrasound Waves in Hydrogel-based Resonators", N. Farhoudi, H.-Y. Leu, J. Magda, F. Solzbacher, C.F. Reiche, presented at TechConnect World Innovation Conference, Boston MA, June 2019. Other, Presented, 06/17/2019.

A Rheological Study of Water in Oil Emulsions with Implications on Cold Start of Waxy Oils Containing Water", Y. Wang, J. Magda, R. Venkatesan, M. Deo, presented at the 2019 Petrophase Meeting, Kanazawa, Japan. Other, Presented, 06/03/2019.

"Metal-Oxide-Hydrogel Field-Effect Sensor", S. Dolai, H.-Y. Leu, J. Magda, M. Tabib-Azar, presented at IEEE Sensors, New Delhi, India, Oct 28-31, 2018. Other, Presented, 10/29/2018.

"Effects of the Presence of Water in Cold Restart of Waxy Oils", Y. Wang, J. Magda, M. Deo, presented at the 2018 AIChE Annual Meeting. Other, Presented, 10/29/2018.

"Study of accuracy and selectivity of a hydrogel-based sensor array by Design of Experiments (DOE)", P. Tathireddy, R. Sharma, N. Frazier, S.H. Cho, Y. Goo, D. West, J.J. Magda presented at Single-Use Technologies III: Scientific and Technological Advancements, Snowbird, Utah. Other, Presented, 09/25/2018.

"Responsive hydrogel sensor for monitoring antibody production", N. Frazier, S.H. Cho, Y. Goo, P. Tathireddy, R. Sharma, J.J. Magda presented at Single-Use Technologies III: Scientific and Technological Advancements, Snowbird, Utah. Other, Presented, 09/24/2018.

"A sensor platform for smart hydrogels in biomedical applications", J. Körner, C. F. Reiche, H.-Y. Leu, N. Farhoudi, J. Magda & F. Solzbacher , presented at Eurosensors Graz (Austria). Other, Presented, 09/11/2018.

"Use of a thixotropic rheology model to predict the transient pipe flow behavior of model waxy crude oil suspensions", Y. Wang, M. Deo, R. Venkatesan, J. Magda, Petrophase 2018. Other, Presented, 07/12/2018.

"Point-of-Use Sensors", C. Willis, Y. Saffray, L. McKinnon, S. Hegde, J. Grubb, H.-Y. Leu, K. Kelly, J. Magda, M. Misra, S. Mohanty, United States Air Force Science & Technology 2030 Workshop, University of Utah, July 11, 2018. Other, Presented, 07/11/2018.

"Fast-Reacting Smart Hydrogel-Based Sensor Platform for Biomedical Applications", J. Koerner, C.F. Reiche, H.-Y. Leu, J.J. Magda, F. Solzbacher, TechConnect World Innovation Conference & Expo, Anaheim, CA, May 13-16. Other, Presented, 05/14/2018.

"Molecular-imprinted thrombin responsive hydrogels integrated into a microfluidics device with electronic readout", H.-Y. Leu, F. Solzbacher, J. Magda, S. Mohanty, Point-of-Care Diagnostics and Global Health 2018, San Diego, CA, Oct 1-3, 2018.

"Ultrasonic Biosensors Using Smart Hydrogels", N. Farhoudi, C. Reiche, H.-Y. Leu, J. Magda, F. Solzbacher, 2017 Fall MRS Meeting, Boston. Other, Presented, 11/30/2017.

"Fast-Reacting Biosensors Based Upon Smart Hydrogels With Low Space Requirements", C. Reiche, J. Koerner, H.-Y. Leu, J. Magda, F. Solzbacher, 2017 MRS Fall Meeting, Boston, MA. Other, Presented, 11/29/2017.

M. Deo, J. Magda, Y. Wang, "Effect of the Presence of Water in Cold Restart of Waxy Oils", 2016 PetroPhase conference, Elsinore, Denmark. Other, Presented, 06/20/2016.

T. Nguyen, J. Magda, P. Tathireddy, “Effect of Electrostatic Interactions on the Response of Zwitterionic Glucose Sensitive Hydrogels Designed for Bioprocess Sensing”, 251st ACS National Meeting, San Diego, CA, March 13-17, 2016.

## PhD STUDENTS GRADUATED (last 5 years)

Yi Chen Wang, PhD in Chemical Engineering, Spring 2020

Hsuan-Yu Leu, PhD in Chemical Engineering, Spring 2020

Tram Nguyen, PhD in Chemical Engineering, Spring 2017

*Currently supervising three PhD students*.

## SERVICE (last 5 years)

RPT Chairperson 1/1/2016 – 8/1/2020

Member of Department Undergraduate Committee 1/1/2016 – current