Guy Kenneth German

CAREER SUMMARY

2013-Present	*Assistant Professor,* Departments of Biomedical Engineering and the Decker School of Nursing, Binghamton University, Binghamton, NY, USA, 13902
2009-2012	*Post Doctoral Research Associate,* Department of Mechanical Engineering and Materials Science, Yale University, New Haven, CT, USA. Research: '*Heterogeneous mechanics of the skin barrier*' Research: '*Stabilisation of fluid interfaces using sub-micron sized, dumbbell shaped colloidal surfactants*'
2006-2009	*PhD student,* Institute of Materials and Processes, The University of Edinburgh, Edinburgh, U.K. Research: '*Drop dynamics of yield-stress fluids*'
2003-2006	*Senior Engineering Consultant,* International Design Engineering and Services Ltd., Glasgow, U.K.
2002-2003	*Engineering Consultant,* Computational Dynamics Ltd. Hammersmith, London, U.K
2000-2002	*High speed wing design aerodynamicist & Trans-national aerodynamics task leader of blended wing type aircraft,* Airbus U.K., Bristol, U.K.
1999-2000	MSc. Aerospace Dynamics with specialisation in Aerodynamics, Cranfield University, Bedfordshire, U. K.. Full E.P.S.R.C Scholarship
1994-1999	MPhys. Astrophysics (Hons) ii:1, The University of Edinburgh, Edinburgh, U.K.

AWARDS/SCHOLARSHIPS

2014	International Society for Biophysics and Imaging of the Skin World Congress ❑ Kligman Award for X. Liu ❑ Project title: 'Dynamic Drying Mechanics of Human Stratum Corneum and the Effects of Moisturization.
2009	Best presentation award – V. Bertola, G.German ❑ Viscoplastic Fluids : From Theory to Application, Limas sol , Cyprus , 1-5 November 2009.
2006-2008	Aerosol Society C. N Davies award ❑ Project title: 'The effect of polymer additives and viscoplasticity on fluid drop impact and spreading'
2006	Royal Society of Edinburgh ❑ J M. Lessells Postgraduate Travel Grant Scheme ❑ Project title: 'Drop impact and spreading behavior of complex fluids'

INVITED TALKS

04/06/2016	North East Bioengineering Conference, Binghamton University Xue Liu and G. K. German, ❑ The global mechanical properties and multi-scale failure mechanics of heterogeneous human stratum corneum.
04/06/2016	North East Bioengineering Conference, Binghamton University J. M. Cleary, M. Kim, C. H. Màrques, and G. K. German, ❑ Stratum Corneum Lipid Composition Alters the Heterogeneous Growth of *Staphylococcus aureus.*

Materials Science Engineering Lecture, Binghamton University

09/30/2015 ❑ The human skin barrier: Multi-scale mechanics, cosmetics and the growth of bacterial infections

09/25/2015 Distinguished Life Sciences and BME Lecture, Binghamton University
❑ The human skin barrier: Multi-scale mechanics, cosmetics and the growth of bacterial infections

03/20/2015 Avon Cosmetics Research and Development, Suffern, NY
❑ Research in The Binghamton Biological Soft Matter Mechanics Laboratory

11/7/2014 Department of Mechanical Engineering, University of Rochester, Rochester, NY
❑ Traction Force in Physics and Biology: Collective cell and tissue mechanics, durotaxis, and the physics of cleansing and moisturizing.

10/14/2014 Lubrizol Corporation University Contacts Meeting Lubrizol Corporation, Cleveland, OH
❑ Soft matter mechanics: from skin biomechanics to the rheology of viscoplastic materials

07/30-31/2014 Symposium in honor of David Cole-Hamilton, St. Andrews, Scotland
❑ The impact of cosmetic cleansers and moisturisers on skin barrier damage, mechanics and functionality

06/01-04/2014 International Society for Biophysics and Imaging of the Skin (ISBS)
❑ Dynamic Drying Mechanics of Human Stratum Corneum and the Effects of Moisturization
❑ X. Liu awarded ISBS Kligman Award, Mystic, CT

11/25/2013 Decker School of Nursing, Binghamton University
❑Mechanics of the skin barrier: From the effects of cosmetic products to cracking in dry skin disorders

11/22/2013 Watson School Advisory Board, Watson School of Engineering and Applied Sciences, Binghamton University
❑ Mechanics and Mechanobiology of Soft Tissues

02/29/2013 CPSI Biotech, Owego, NY 13827
❑ Measuring the mechanics of cells and tissues using Traction Force Microscopy

06/28/2013 Institute for Science and Technology in Medicine, Keele University, UK
❑ Measuring the mechanics of cells and tissues using Traction Force Microscopy

03/15/2013 Department of Biological Sciences, Binghamton University.
❑ Measuring the mechanics of cells and tissues using Traction Force Microscopy

2011 Gotham-Metro Condensed Matter Conference: New York Academy of Sciences, 11 November 2011.
❑ Title: 'Janus dumbbells create high strength oil/water interfaces'.

2009 Gordon Research Conference: Barrier function of Mammalian Skin, New Hampshire, U.S.A, August 2009.
❑ Title: 'Imaging stress in the stratum corneum during dehydration'.

TEACHING & ADMINISTRATION

Academic teaching.

2013-Present **Binghamton University**
- ❑ BME 318 Biomechanics
- ❑ BME 303 Biofluid Mechanics
- ❑ BME 203 Biomedical Modeling and Numerical methods
- ❑ BME 443 Bio-MEMS
- ❑ BME 472/572 Experimental Design and Statistical Methods

2006-2009 **University of Edinburgh (UK)**
- ❑ Teaching assistant for Energy Systems 4 (2006,2007).
- ❑ Teaching assistant for Computational Fluid Dynamics 5 (2008).

Project management and mentoring

2013-Present **Binghamton University**

- ❑ Primary Investigator of the Binghamton Biological Soft Matter Mechanics Laboratory.
- ❑ Current lab members: 4 Ph.D. students, 4 MS students, 2 undergraduate students.
- ❑ Co-adviser to 2 Ph.D. (Chemistry, Mechanical Engineering)
- ❑ Faculty Advisor to 2 CAPSTONE Senior Design Groups
- ❑ Faculty supervisor 'Alpha Eta Mu Epsilon' Biomedical Engineering Honors Society
- ❑ Faculty supervisor Tau Beta Pi Engineering Honors Society (2014)

2003-2006 **I.D.E.A.S Ltd., (Glasgow, U.K.)**

- ❑ Project management of computational fluid dynamics (CFD) and acoustic engineering consultancy projects for Shell, Total & Kerr McGee.

PUBLICATIONS

Peer - reviewed Journals

1. X. Liu and **G. K. German**, Measuring and modeling contractile drying in human stratum corneum', *Journal of Visualized Experiments* (Accepted for Publication)
2. X. Liu, K. Reeser, W.J. Doak, K. Ye, and G. K. German, 'A Simple, Low Cost, Data-Logging, Automated Humidity Control System', *Under review in Measurement Science and Technology*.
3. X. Liu and **G. K. German**, 'The global mechanical properties and multi-scale failure mechanics of heterogeneous human stratum corneum'. *Acta Biomaterialia*, **43**, 78-87 (2016)
4. W. J. Doak, D. M. Laiacona, **G. K. German** and P. R. Chiarot, Rebound of Continuous Droplet Streams from and Immiscible Liquid Pool', Physics of Fluids, **28**, 057104 (2016)
5. X. Liu and **G. K. German**, 'The effect of barrier disruption and moisturization on the dynamic drying mechanics of human stratum corneum' Journal of the Mechanical Behavior of Biomedical Materials. 40:80-89 (2015)
6. (*Review Article*) R. W. Style, R. Boltyanskiy, **G. K. German**, C. Hyland, C. W. MacMinn, A. F. Mertz, and E. R. Dufresne, 'Using Traction Force Microscopy in Physics and Biology', *Soft Matter* (2014).
7. R. W. Style, Y. Che, S. J. Park, B. M. Weon, J. H. Je, C. Hyland, **G. K. German**, M. Power, L. A. Wilen, J. S. Wettlaufer and E. R. Dufresne, 'Patterning Droplets on Surfaces by Durotaxis', *Proceedings of the National Academy of Sciences of the United States of America*, doi:10.1073/pnas.1307122110 (2013)
8. **G. K. German**, E. Pashkovski and E. R. Dufresne, 'Surfactant treatments influence drying mechanics in human *stratum corneum', Journal of Biomechanics*, 46(13), pp. 2145-2151 (2013)
9. Y. Xu, **G. K. German**, A. F. Mertz, E. R. Dufresne, 'Imaging stress and strain in the fracture of drying colloidal films', *Soft Matter* DOI: 10.1039/C3SM27912J (2013)
10. **G. K. German**, E. Pashkovski, Y.Xu, A.F. Mertz, C. Hyland, W. C. Engl and E. R. Dufresne, 'Heterogeneous drying stresses in stratum corneum', *Biophysical Journal* 102(11), pp. 2424-2432 (2012)
11. A. F. Mertz, S. Banerjee, Y. Che, **G. K. German**, Y. Xu, C. Hyland, M. C. Marchetti, V. Horsley and E. R. Dufresne,' Scaling of Traction Forces with Size of Cohesive Cell Colonies,' *Phys. Rev. Lett.* 108, 198101 (2012).
12. **G. German** and V. Bertola, 'The spreading behaviour of viscoplastic drops,' *Colloids and Surfaces A: Physiochemical and Engineering Aspects,* 366, pp. 18-26 (2010).
13. **G. German** and V. Bertola, The free fall of viscoplastic drops, *Journal of Non-Newtonian Fluid Mechanics,* 165, pp. 825-828 (2010).
14. **G. German** and V. Bertola, 'Formation of viscoplastic drops by capillary breakup,' *Physics of Fluids*, 22, 033101 (2010).

15. **G. German** and V. Bertola, 'Review of drop impact models and validation with high viscosity Newtonian fluids,' *Atomization and Sprays* ,19, pp. 787-807 (2009).
16. **G. German** and V. Bertola, 'Impact of shear-thinning and yield- stress drops on solid substrates,' *Journal of Physics : Condensed Matter*, 21, 375111 (2009).

Conference Proceedings

1. **G. German** and V. Bertola, Yield stress drops :creation, free- fall and impact on a solid surface, *Proc . 7t h World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics* , Cracow, Poland, 28 June – 3 July 2009.

Conference abstracts

1. J. Cleary, M. Kim, C. Marques, and G. K. German, Stratum corneum lipid composition alters the heterogeneous growth of *Staphylococcus aureus*, Biomedical Engineering Society Annual Meeting, Minneapolis, MN, October 5-8 2016.
2. J. Bramsen, S. Dahal, S. Mina, C. Maiorana, G. K. German, B. Murray, P. Huang, and G. Mahler, Decreased Cell Adhesion Strength Promotes Endothelial to Mesenchymal Transformation, Biomedical Engineering Society Annual Meeting, Minneapolis, MN, October 5-8 2016.
3. J. Cleary, M. Kim, C. Marques, and G. K. German, Stratum corneum lipid composition alters the heterogeneous growth of *Staphylococcus aureus*, Journal of Investigative Dermatology, **136**(8), B7 (2016)
4. J. M. Cleary, M. Kim, C. H. Màrques, and G. K. German, Stratum Corneum Lipid Composition Alters the Heterogeneous Growth of *Staphylococcus aureus*, North East Bioengineering Conference, Binghamton University, April 5-7 2016
5. Zachary M. Eller, Cláudia N. H. Marques, Guy K. German, Traction Force Microscopy on Expanding *Pseudomonas aeruginosa* Colony Fronts, North East Bioengineering Conference, Binghamton University, April 5-7 2016
6. Xue Liu and G. K. German, The global mechanical properties and multi-scale failure mechanics of heterogeneous human stratum corneum, North East Bioengineering Conference, Binghamton University, April 5-7 2016
7. Xue Liu and Guy German, 'Quantification of Multi-Scale Mechanics and Failure of Human Stratum Corneum', Biophysical Journal, vol. 110, issue 3, p. 167a. Biophysical Society, Los Angeles, California, February 27 – March 2 2016.
8. W. Doak, D. Laiacona, P. Chiarot and G. K. German, 'High Velocity Droplet Rebound On Liquid Pools'. American Physical Society Division of Fluid Dynamics 68th Annual Meeting, Boston, Massachusetts, November 2015
9. X. Liu and G. K. German, 'Quantifying the multi-scale mechanics and failure of human stratum corneum'. Gordon Research Conference: Barrier Function of Mammalian Skin, New Hampshire, August 2015
10. J. Cleary, M. Kim, C. M. Marques and G. K. German, 'Stratum corneum lipid composition alters the heterogeneous growth of staphylococcus aureus infections'. Gordon Research Conference: Barrier Function of Mammalian Skin, New Hampshire, August 2015
11. Y. Liu, C. H. Maiorana, N. Rogel, G. M. Mahler, G. K. German and A. I. Doiron, 'Towards Safer Nanomaterials: Investigating Endothelial Cell Mechanical Properties and Barrier Function' 41st Northeast Bioengineering Conference, Rensselaer Poytechnic Institute, Troy, NY, April 17-19 2015
12. C. Maiorana, Y. Liu, N. Rogel, A. I. Doiron and G. K. German Towards Safer Nanomaterials: Investigating Endothelial Cell Mechanical Properties and Barrier Function. 42nd New England Complex Fluids Workshop, Yale University, New Haven, CT, March 20 2015
13. X. Liu and G. K. German The effects of barrier disruption and moisturization on the dynamic drying mechanics of human stratum corneum. 42nd New England Complex Fluids Workshop, Yale University, New Haven, CT, March 20 2015

14. J. Cleary, M. Kim, C. M. Marques and G. K. German Mechanisms of Atopic Dermatitis. 42nd New England Complex Fluids Workshop, Yale University, New Haven, CT, March 20 2015
15. Y. Liu, C. H. Maiorana, N. Rogel, G. M. Mahler, G. K. German and A. I. Doiron. 'Towards Safer Nanomaterials: Investigating Endothelial Cell Mechanical Properties and Barrier Function'. Biomedical Engineering Society, San Antonio, October 22-25 2014.
16. X. Liu and G. K. German, 'Dynamic Drying Mechanics of human stratum corneum and the effects of Moisturization'. Biomedical Engineering Society, San Antonio, October 22-25 2014.
17. S. Sanchez and G. K. German. 'The Moisturizing Ability of High Molecular Weight Polymers', Louis Stokes Alliance and Minority Participation & Ronald McNair Post baccalaureate Achievement Program, Engineering and Science Building, Binghamton University, July 18 2014
18. G. K German, 'The impact of cosmetic cleansers and moisturisers on skin barrier damage, mechanics and functionality'. Symposium in honor of David Cole-Hamilton, St. Andrews, Scotland'30-31 July 2014.
19. X. Liu and G. K. German, 'Dynamic Drying Mechanics of Human Stratum Corneum and the Effects of Moisturization'. International Society for Biophysics and Imaging of the Skin World Congress, Mystic, CT June 2-4 2014
20. X. Liu and G. K. German, 'Dynamic Drying Mechanics of Human Stratum Corneum and the Effects of Moisturization', Gordon Research Conference: Barrier Function of Mammalian Skin, New Hampshire, August 2013.
21. S. J. Park, B. M. Weon, J. S. Lee, J. H. Je, R. W Style, G. K German, E. R Dufresne and S. Wang, 'X-ray imaging of wetting ridge on a soft solid', APS March Meeting 58(1) (2013).
22. G. K. German , J-G. Park, J. Nam, J. D. Forster, T. K. Vanderlick and E. R. Dufresne, 'Janus dumbbells create high-strength oil/water interfaces', Gotham-Metro Condensed Matter Conference: New York Academy of Sciences, 11 November 2011.
23. G. K. German, E. Pashkovski and E. R Dufresne, 'Imaging stress in the stratum corneum during drying', Gordon Research Conference: Barrier Function of Mammalian Skin, New Hampshire, August 2011.
24. G. K. German , J-G. Park ,J. Nam, J. D. Forster, T. K. Vanderlick, E. R. Dufresne,' Stabilization of fluid interfaces by particles with geometrical and compositional heterogeneity', ACS Colloids 85th Symposium, McGill University, Canada, June 2011.
25. G.K German, J-G Park, J. D. Forster and E. R. Dufresne, 'Stabilisation behavior of Chemically Anisotropic Dumbbell Particles', 46th New England Complex Fluids Workshop, Yale University March 2011.
26. G.K German, E. Pashkovski and E. R. Dufresne, 'A new approach to traction force microscopy reveals heterogeneity in stratum corneum during drying', 45th New England Complex Fluids Workshop, Harvard University, December 2010.
27. G. K. German, E. Pashkovki, V Horsley and E. R. Dufresne, ' Traction force microscopy reveals the mechanical heterogeneity of stratum corneum', Society for Investigative Dermatology, 70th Annual Meeting, Atlanta, March 2010.
28. G. K. German, E. Pashkovski and E. R Dufresne, 'Imaging stress in the stratum corneum during dehydration', Gordon Research Conference: Barrier Function of Mammalian Skin, New Hampshire, August 2009.
29. G. German, V. Bertola, 'Yield stress drops' , 7th Euromech Fluid Mechanics Conference , Manchester (UK) , 14-18 September 2008.
30. G. German, V. Bertola, 'Controlling drop deposition using complex fluids' , 22nd Scottish Fluid Mechanics Meeting, Edinburgh, 22 May 2008.
31. G. German, V. Bertola, 'Yield stress drops', Aerosol Society Annual Conference , Leeds (United Kingdom), 7-8 April 2008.