

Isabella Gallino, Ph.D.

Universität des Saarlandes
Lehrstuhl für Metallische Werkstoffe
Campus C6.3, 5. Etage
66123 Saarbrücken, Germany
Tel: +49(0)681-302-2052
Fax: +49(0)681-302-4385

**Degrees**

- Ph.D., Oregon State University, Corvallis OR USA (2003)
Thesis (Materials Science and Engineering): 'Phase Diagram, Thermal Stability, and High Temperature Oxidation of the Ternary Cu-Fe-Ni System' (Prof. Michael E. Kassner)
- Laurea in Chemistry, University of Turin, Italy (1997)
Thesis (Inorganic and Solid State Chemistry): 'Solid State Reactions in Al/Ni Alternate Foils Induced by Cold Rolling and Annealing' (Prof. Livio Battezzati)

Professional experience

- Research Scientist, Saarland University, Germany (September 2005-present)
- Assistant Professor of Mechanical Engineering, Oregon State University USA (2004-2005)
- Lecturer of Mechanical Engineering, Oregon State University USA (2003-2004)
- Visiting Researcher, University of Dortmund, Germany (Summer 2004)
- Researcher, The Netherlands Institute for Metals Research (NIMR), Delft-NL (1998-'99)

Research activities (since 1997)

Metallic glasses. Conventional crystalline alloys. Metallic multilayered thin films. Alloy development and processing. Thermodynamics and kinetics of phase transformation. Interface reactions.

Teaching experience (continuous teaching since 2002)

Corrosion and Oxidation of Metals;
Introduction to Materials Science;
Rate Processes in Materials;
Kinetics of Amorphous Materials;
Thermodynamics of Materials;
Fracture and Fatigue of Materials;
Materials Science Laboratory

Professional activities (Funding: ~1,850,000 € for research and ~ 800,000 € for education)**DGF projects:**

1. (2020-2023) *Thermodynamic analysis and modeling of novel ternary Ni-S-based bulk metallic-forming systems*. DFG-GA1721/4-1. Collaborative research project with Prof. Ralf Busch (Saarland University) and Prof. Hans-Juergen Seifert (KIT-Karlsruhe)
2. (2019-2022) *Thermodynamic and kinetics of Ni/Al Morphologies*. DFG-GA1721/3-1. Collaborative research project with UdS, TU-Ilmenau and KIT-Karlsruhe.
3. (2016-2018) *Thermophysical properties of non-Zr-based multicomponent bulk metallic glass alloys*. DFG-GA1721/2-2
4. (2012-2104) *Thermophysical properties of non-Zr-based multicomponent bulk metallic glass alloys*. DFG-GA1721/2-1

IGF/AiF projects:

1. (2018-2020) *Development, processing and thermoplastic forming of Ni-free Pt-based bio-compatible bulk metallic glasses*
2. (2014-2016) *Alloy development and thermoplastic forming of 18 carat white-gold bulk metallic glasses*
3. (2010-2012) *Alloy development and corrosion properties of 18 carat white-gold bulk metallic glasses*

Education & Training:

1. (2017-present) *Habilitation track* in Materials Science and Engineering (Focus: Metallic Glasses).
2. (2007-present) *Student Adviser* for the ATLANTIS Double Bachelor's degree in Materials Science and Mechanical Engineering.
3. (2007-2012) Acquisition of funding and development of the ATLANTIS Bachelor, a Double Bachelor's degree in Materials Science and Mechanical Engineering between Germany, Sweden, and USA. Funded by the EU-US ATLANTIS programme (EACEA).
4. (2004-2005) *Student Adviser* for Bachelor students in Mechanical Engineering (in USA)

Publications

1. X. Monnier, D. Cangialosi, B. Ruta, R. Busch, I. Gallino, *Vitrification decoupling from α -relaxation in a metallic glass*, **Science Advances** 6 (17) (2020) eaay1454. Selected by the European Synchrotron Radiation Facility (ESRF) for an Annual Highlight in 2020
2. B. Ruta, S. Hechler, N. Neuber, D. Orsi, L. Cristofolini, O. Gross, B. Bochtler, M. Frey, A. Kuball, S.S. Riegler, M. Stolpe, Z. Evenson, C. Gutt, F. Westermeier, R. Busch, I. Gallino, *Wave-vector dependence of the dynamics in supercooled metallic liquids*, **Physical Review Letters** 125/ 5 (2020) 05570127
3. A. Baksi, S.H. Nandam, D. Wang, R. Kruk, R.M. Chellali, J. Ivanisenko, I. Gallino, H. Hahn, S. Bag, *Ni60Nb40 Nanoglass for Tunable Magnetism and Methanol Oxidation*, **ACS Applied Nano Materials** 3/7 (2020) 7252-7259
4. N. Neuber, M. Frey, O. Gross, J. Baller, I. Gallino, R. Busch, *Ultrafast scanning calorimetry of newly developed Au-Ga bulk metallic glasses*, **Journal of Physics: Condensed Matter** 32/32 (2020) 324001
5. H.-R. Jiang, B. Bochtler, S. S. Riegler, X.-S. Wei, N. Neuber, M. Frey, I. Gallino, R. Busch, J. Shen, *Thermodynamic and kinetic studies of the Cu–Zr–Al (–Sn) bulk metallic glass-forming system*, **J. Alloys and Compounds** 844 (2020) 156126
6. N. Neuber, O. Gross, M. Eisenbart, A. Heiss, U.E. Klotz, J.P. Best, M.N. Polyakov, J. Michler, R. Busch, I. Gallino, *The role of Ga addition on the thermodynamics, kinetics, and tarnishing properties of the Au-Ag-Pd-Cu-Si bulk metallic glass forming system*, **Acta Materialia** 125 (2019) 315-326
7. C. Pauly, K. Woll, I. Gallino, M. Stüber, H. Leiste, R. Busch and F. Mücklich, *Ignition in ternary Ru/Al-based reactive multilayers – Effects of chemistry and stacking sequence*, **J. of Applied Physics** 124 (2018) 195301
8. S. Hechler, B. Ruta, M. Stolpe, E. Pineda, Z. Evenson, O. Gross, W. Hembree, A. Bernasconi, R. Busch, and I. Gallino, *Microscopic evidence of the connection between liquid-liquid transition*

- and dynamical crossover in an ultraviscous metallic glass former, **Physical Review Materials** 2 (2018) 085603
9. M. Frey, R. Busch, W. Possart, I. Gallino, *On the Thermodynamics, Kinetics, and Sub-Tg Relaxations of Mg-Based Bulk Metallic Glasses*, **Acta Materialia** 155 (2018) 117-127
 10. S. Hechler, I. Gallino, M. Stolpe, F.T. Lentjes, R. Busch, *Analysis of thermophysical properties of lead silicates in comparison to bulk metallic glasses*, **J. Non-Crystalline Solids** 485 (2018) 66-73
 11. O. Gross, M. Eisenbart, L.Y. Schmitt, N. Neuber, L. Ciftci, U.E. Klotz, R. Busch, I. Gallino, *Development of novel 18-karat, premium-white gold bulk metallic glasses with improved tarnishing resistance*, **Materials & Design** 140 (2018) 495-504
 12. I. Gallino, D. Cangialosi, Z. Evenson, L. Schmitt, S. Hechler, M. Stolpe, and B. Ruta, *Hierarchical aging pathways and reversible fragile-to-strong transition upon annealing of a metallic glass former*, **Acta Materialia** 144 (2018) 400-410
 13. O. Gross, S.S. Riegler, M. Stolpe, B. Bochtler, A. Kuball, S. Hechler, R. Busch, I. Gallino, *On the high glass-forming ability of Pt-Cu-Ni/Co-P-based liquids*, **Acta Materialia** 141 (2017) 109–119
 14. O. Gross, B. Bochtler, M. Stolpe, S. Hechler, W. Hembree, R. Busch, and I. Gallino, *The kinetic fragility of Pt-P- and Ni-P-based bulk glass forming liquids and its thermodynamic and structural signature*, **Acta Materialia** 132 (2017) 118-127
 15. I. Gallino, *On the fragility of bulk metallic glass forming liquids*, **Entropy** 19 (2017) 483-497
 16. R. Busch, I. Gallino, *On the kinetic, thermodynamics and structure of bulk metallic glass forming liquids*, **JOM-J Min. Met. Mat. S.** 69 (2017) 2178–2186
 17. I. Gallino, R. Busch, *Relaxation pathways in metallic glasses*, **JOM-J Min. Met. Mat. S.** 69 (2017) 2171–2177
 18. H. Aboulfadl, I. Gallino, R. Busch, F. Mücklich, *Atomic Scale Analysis of Phase Formation and Diffusion Kinetics in Ag/Al Multilayer Thin Films*, **J. of Applied Physics** 120/20 (2016) 195306
 19. B. Bochtler, O. Gross, I. Gallino, R. Busch, *Thermo-physical characterization of the $Fe_{67}Mo_6Ni_{3.5}Cr_{3.5}P_{12}C_{5.5}B_{2.5}$ Bulk Metallic Glass Forming Alloy*, **Acta Materialia** 118 (2016) 129-139
 20. S. Stanojevic, I. Gallino, H. Aboulfadl, M. Sahin, F. Mücklich, R. Busch, *Oxidation of Glassy Ni-Nb-Sn Alloys and its Influence on the Thermodynamics and Kinetics of Crystallization*, **Acta Materialia** 102 (2016) 176-186
 21. Z. Evenson, B. Ruta, S. Hechler, M. Stolpe, E. Pineda, I. Gallino, R. Busch, *X-ray Photon Correlation Spectroscopy Reveals Intermittent Aging Dynamics in a Metallic Glass*, **Physical Review Letters** 115/ 17 (2015) 175701
 22. S. Wei , O. Gross. M. Stolpe, Z. Evenson, I. Gallino, W. Hembree, J. Bednarcik, J.J. Kruzic; , R. Busch, *Linking structure to fragility in metallic glass-forming*, **Applied Physics Letters** 106 (2015) 181901
 23. Z. Evenson, T. Koschine, S. Wei, O. Gross, J. Bednarcik, I. Gallino, J.J. Kruzic, K. Rätzke, F. Faupel, R. Busch, *The effect of low-temperature structural relaxation on free volume and chemical short-range ordering in a $Au_{49}Cu_{26.9}Si_{16.3}Ag_{5.5}Pd_{2.3}$ bulk metallic glass*, **Scripta Materialia** 103 (2015) 14-17
 24. S. Wei, E. Evenson, I. Gallino, R. Busch, *The impact of fragility on the calorimetric glass transition in bulk metallic glasses*, **Intermetallics** 55 (2014) 138-144

25. Z. Evenson, S.E. Naleway, S. Wei, O. Gross, J.J. Kruzic, I. Gallino, W. Possart, M. Stommel, R. Busch, β relaxation and low-temperature aging in a Au-based bulk metallic glass: From elastic properties to atomic-scale structure, **Physical review B** 89 (17) (2014) 174204
26. M. Eisenbart, U.E. Klotz, R. Busch, I. Gallino, A colourimetric and microstructural study of the tarnishing of gold bulk metallic glasses, **Corrosion Science** 85 (2014) 258-269
27. M. Eisenbart, U.E. Klotz, R. Busch, I. Gallino, *On the Abnormal Room Temperature Tarnishing of an 18 Karat Gold Bulk Metallic Glass Alloy*, **J. Alloys and Compounds** 615 (S1) (2014) 118-122
28. I. Gallino, O. Gross, G. dalla Fontana, Z. Evenson, R. Busch, *On the kinetics and thermodynamic fragility of the $Pt_{60}Cu_{16}Co_2P_{22}$ and $Pt_{57.3}Cu_{14.6}Ni_{5.3}P_{22.8}$ bulk metallic glasses*, Alloy', **J. Alloys and Compounds** 615 (S1) (2014) 35-39
29. Z. Evenson, T. Schmitt, N. Mattheis, I. Gallino and R. Busch, *High Temperature Melt Viscosity and Fragile-To-Strong Transition in Zr-Cu-Ni-Al-Nb(Ti) and $Cu_{47}Ti_{34}Zr_{11}Ni_8$ Bulk Metallic Glasses*, **AIP Conf. Proc.** 1518, (2012) 197-205
30. W. H. Warnes, J. J. Kruzic, C. C. Pratt, C. Stehr, D. P. Cann, B. J. Gibbons, I. Gallino, F. Soldera, R. Busch and L. Wallström, *Improving Participation of Engineering Students Studying Abroad: An International Dual-Degree Program in Materials Science and Mechanical Engineering*, **JOM** (23 May 2013) DOI: 10.1007/s11837-013-0637-9
31. I. Gallino, M.E. Kassner, and R. Busch, *Oxidation and corrosion of highly alloyed Cu-Fe-Ni as inert anode material for aluminum electrowinning in as-cast and homogenized conditions*, **Corrosion Science** 63 (2012) 293-303
32. Z. Evenson, T. Schmitt, M. Nicola, I. Gallino, and R. Busch, *High temperature melt viscosity and fragile-to-strong transition in Zr-Cu-Ni-Al-Nb(Ti) and $Cu_{47}Ti_{34}Zr_{11}Ni_8$ bulk metallic glasses*, **Acta Materialia** 60(12) (2012) 4712-4719
33. S. Wei, I. Gallino, R. Busch, and C. A. Angell, *Glass transition with decreasing correlation length during cooling of $Fe_{50}Co_{50}$ superlattice and strong liquids*, **Nature Physics** 7(2) (2011) 178-182
34. S. L. Philo, J. Heinrich, I. Gallino, R. Busch, and J. J. Kruzic, *Fracture and fatigue behavior of a $Zr_{58.5}Cu_{15.6}Ni_{12.8}Al_{10.3}Nb_{28}$ bulk metallic glass forming alloy*, **Scripta Materialia** 64 (2010) 359-362
35. Z. Evenson, S. Raedersdorf, I. Gallino and R. Busch, *Equilibrium Viscosity of Zr-Cu-Ni-Al-Nb Bulk Metallic Glasses*, **Scripta Materialia** 63(6) (2010) 573-576
36. Z. Evenson, I. Gallino, and R. Busch, *The effect of cooling rates on the apparent fragility of Zr-based bulk metallic glasses*, **J. of Applied Physics** 107(12) (2010) Article Number: 123529
37. I. Gallino, J. Schroers, and R. Busch, *Kinetics and thermodynamics studies of the fragility of bulk metallic glass forming liquids*, **J. of Applied Physics** 108(6) (2010) Article Number: 063501
38. I. Gallino and R. Busch, *Metallurgy beyond Fe*, **Publications of the Astronomical Society of Australia** 26(3) (2009) III-VII
39. I. Gallino, S. Curiotto, M. Baricco, M.E. Kassner, and R. Busch, *Homogenization of Highly Alloyed Cu-Fe-Ni: a Phase Diagram Study*, **J. Phase Equilibria And Diffusion** 29(2) (2008) 131-135
40. I. Gallino, M. Shah, and R. Busch, *Enthalpy Relaxation and its Relation to the Thermodynamics and Crystallization of the $Zr_{58.5}Cu_{15.6}Ni_{12.8}Al_{10.3}Nb_{28}$ Bulk Metallic Glass-Forming Alloy*, **Acta Materialia** 55(4) (2007) 1367-1376
41. I. Gallino, R. Busch, H. Choi Yim, L. Jastrow, and U. Köster, *High Temperature Oxidation of the Refractory Alloy Glass $Nb_{35}Ni_{60}Sn_5$* , **J. Alloys and Compounds** 434-435 (2007) 225-228
42. D. Zander, B. Heisterkamp, and I. Gallino, *Corrosion Resistance of Cu-Zr-Al-Y and Zr-Cu-Ni-Al-Nb Bulk Metallic Glasses*, **J. of Alloys and Compounds** 434-435 (2007) 234-236

43. I. Gallino, M. Shah, and R. Busch, *Enthalpy Relaxation of the $Zr_{58.5}Cu_{15.6}Ni_{12.8}Al_{10.3}Nb_{28}$ Bulk Metallic Glass Forming Alloy*, **J. of Alloys and Compounds** 434-435 (2007) 141-144
44. L. Battezzati, P. Pappalepore, F. Durbiano, and I. Gallino, *Solid State Reactions in Al/Ni Alternate Foils Induced by Cold Rolling and Annealing*, **Acta Materialia** 47(6) (1999) 1901–1914

Books or book chapters:

1. R. Busch, Z. Evenson, I. Gallino, S. Wei, *Thermodynamics, Kinetics and Fragility of Bulk Metallic Glass Forming Liquids*. This invited review paper is dedicated to C. Austen Angell for his 80th birthday, and published in a special volume on 'Fragility of Glass-forming Liquids', ed. A. L. Greer, K. F. Kelton, and S. Sastry, Hindustan Book Agency, New Delhi, India (2014) <https://arxiv.org/abs/1405.2251v1>

Patents:

1. DE202016004123 (U1) - Massivglasbildende Weißgoldlegierung (8 August 2016)