

List of Publications – Ueli M. Angst

June 2024

Summary

Scientific journal papers: 109 published/in press (33 as first author)

Additional pre-prints: 2

Conference papers: 78 (21 as first author)

Conference presentations: 116 (36 presented by me)

Invited lectures / seminars: 27

Book chapters: 4

Links to [Google Scholar Profile](#) [Researcher ID: M-6348-2014](#)

Preprints

- Ruffray N, **Angst U***, Schmid T, Zhang Z, Isgor OB. Three-dimensional characterization of the steel-concrete interface by FIB-SEM nanotomography.
Pre-print released in October 2023 on arXiv: <https://arxiv.org/abs/2310.04322>
- Furcas F, Mundra S, Lothenbach B, **Angst U***. Speciation controls the kinetics of iron hydroxide precipitation and transformation.
Pre-print released in November 2023 on arXiv: <https://arxiv.org/abs/2311.12464>

* Corresponding author in the version submitted to a scientific journal

Scientific peer-reviewed journal publications (published or in press)

109. Zhang Z, **Angst U**. Different anomalies of two-stage water absorption in carbonated and non-carbonated cement-based materials.
Cement and Concrete Research (in press)
108. Korber A, Furcas F, Pundir M, Kammer DS, **Angst U**. PourPy – A python package to generate potential-pH diagrams.
Journal of Open Source Software (JOSS) 9 (2024) 6536
[Open access: doi.org/10.21105/joss.06536](https://doi.org/10.21105/joss.06536)
107. Furcas F, Mundra S, Lothenbach B, Borca C, Huthwelker T, **Angst U**. The influence of silicon on the formation and transformation of corrosion products.
Cement and Concrete Research 182 (2024) 107554
[Open access: doi.org/10.1016/j.cemconres.2024.107554](https://doi.org/10.1016/j.cemconres.2024.107554)
106. Rossi E, Governo S, Shakoorioskooie M, Zhan Q, Mundra S, Mannes D, Kaestner A, **Angst U**. X-ray computed tomography to observe the presence of water in macropores of cementitious materials.
RILEM Technical Letters 8 (2024) 165-175.
[Open access: doi.org/10.21809/rilemtechlett.2023.190](https://doi.org/10.21809/rilemtechlett.2023.190)
105. **Angst U**, Rossi E, Boschmann Käthler C, Mannes D, Trtik P, Elsener B, Zhou Z, Strobl M. Chloride-induced corrosion of steel in concrete – insights from bimodal neutron and X-ray microtomography combined with ex-situ microscopy.
Materials and Structures 57 (2024) article number 56
[Open access: doi.org/10.1617/s11527-024-02337-7](https://doi.org/10.1617/s11527-024-02337-7)
104. Valbi V, Furcas F, Neff D, Dillmann P, **Angst U**, Krieg M, Duvauchelle A, Berranger M, Mischler S, Brambilla L, Gutknecht N, Degriigny C. Unique corrosion behavior of an archaeological Roman iron ring: microchemical characterization and thermodynamic considerations.
Corrosion Science (2024) 111946
[Open access: doi.org/10.1016/j.corsci.2024.111946](https://doi.org/10.1016/j.corsci.2024.111946)
103. Martinelli-Orlando F, Mundra S, **Angst U**. Mechanism of cathodic protection of iron and steel in porous media.
Communications Materials 5 (2024) 15
[Open access: doi.org/10.1038/s43246-024-00454-y](https://doi.org/10.1038/s43246-024-00454-y)

102. van Ede MC, **Angst U.** Tafel slopes and exchange current densities of oxygen reduction and hydrogen evolution on steel.
Corrosion Engineering, Science and Technology (2024)
[Open access: doi.org/10.1177/1478422X241227829](https://doi.org/10.1177/1478422X241227829)
101. Troian V, Gots V, Flatt R, **Angst U.** Rehabilitating instead of rebuilding aged or damaged pre-fabricated concrete buildings for reducing CO₂ emissions: the case of Ukraine.
Materials and Structures 57 (2024) 14
[Open access: doi.org/10.1617/s11527-023-02287-6](https://doi.org/10.1617/s11527-023-02287-6)
100. van Ede MC, Fichtner A, **Angst U.** Nondestructive detection and quantification of localized corrosion rates by electrochemical tomography.
NDT & E International (2023) 103005
[Open access: doi.org/10.1016/j.ndteint.2023.103005](https://doi.org/10.1016/j.ndteint.2023.103005)
99. Pfändler P, Bodie K, Crotta G, Pantic M, Siegart R, **Angst U.** Non-destructive corrosion inspection of reinforced concrete structures using an autonomous flying robot
Automation in Construction 158 (2024) 105241
[Open access: doi.org/10.1016/j.autcon.2023.105241](https://doi.org/10.1016/j.autcon.2023.105241)
98. Furcas F, Lothenbach B, Mundra S, Borca C, Albert C, Isgor OB, Huthwelker T, **Angst U.** Transformation of 2-line ferrihydrite to goethite at alkaline pH.
Environmental Science & Technology 57 (2023) 16097–16108
[Open access: doi.org/10.1021/acs.est.3c05260](https://doi.org/10.1021/acs.est.3c05260)
97. Pundir M, Kammer DS, **Angst U.** An FFT-based framework for predicting corrosion-driven damage in fractal porous media.
Journal of the Mechanics and Physics of Solids 179 (2023) 105388
[Open access: doi.org/10.1016/j.jmps.2023.15388](https://doi.org/10.1016/j.jmps.2023.15388)
96. **Angst U.** Steel corrosion in concrete – Achilles' heel for sustainable concrete?
Cement and Concrete Research 172 (2023) 107239
[Open access: doi.org/10.1016/j.cemconres.2023.107239](https://doi.org/10.1016/j.cemconres.2023.107239)
95. Mundra S, Tits J, Wieland E, **Angst U.** Aerobic and anaerobic oxidation of ferrous ions in near-neutral solutions.
Chemosphere (2023) 138955
[Open access: doi.org/10.1016/j.chemosphere.2023.138955](https://doi.org/10.1016/j.chemosphere.2023.138955)
94. Ziehensack E, Keßler S, **Angst U.**, Hilbig H, Gehlen Ch. Diffusion potentials in hardened saturated cement paste upon chloride exposure.
Materials and Structures 56 (2023) 100
[Open access: doi.org/10.1617/s11527-023-02184-y](https://doi.org/10.1617/s11527-023-02184-y)
93. Troian V, Gots V, Keita E, Roussel N, **Angst U.**, Flatt R. Challenges in material recycling for postwar reconstruction.
RILEM Technical Letters 7 (2022)
[Open access: doi.org/10.21809/rilemtechlett.2022.171](https://doi.org/10.21809/rilemtechlett.2022.171)
92. Martinelli-Orlando F, Déneraud E, Grange R, **Angst U.** Second-harmonic generation technique for in situ study of passive film formation on carbon steel surfaces in aqueous solutions.
Materials and Corrosion (2022)
[Open access: doi.org/10.1002/maco.202213464](https://doi.org/10.1002/maco.202213464)
91. Pfändler P, Bircher L, **Angst U.** Inspecting the corrosion state of underground reinforced concrete structures.
Journal of Infrastructure Preservation and Resilience 3 (2022) 17
[Open access: doi.org/10.1186/s43065-022-00064-3](https://doi.org/10.1186/s43065-022-00064-3)
90. Pfändler P, Kessler S, Huber M, **Angst U.** Spatial variability of half-cell potential data from a reinforced concrete structure—a geostatistical analysis.
Structure and Infrastructure Engineering (2022)
[Open access: doi.org/10.1080/15732479.2022.2158204](https://doi.org/10.1080/15732479.2022.2158204)
89. Albert C, Isgor OB, **Angst U.** Exploring machine learning to predict the pore solution composition of hardened cementitious systems.
Cement and Concrete Research 162 (2022) 107001
[Open access: doi.org/10.1016/j.cemconres.2022.107001](https://doi.org/10.1016/j.cemconres.2022.107001)
88. van Ede M, **Angst U.** Analysis of Polarization Curves Under Mixed Activation-Diffusion Control: An Algorithm to Minimize Human Factors.
CORROSION 78 (2022) 1087–1099
[Open access: doi.org/10.5006/4171](https://doi.org/10.5006/4171)

87. Zhang Z, **Angst U**. Microstructure and moisture transport in carbonated cement-based materials incorporating cellulose nanofibrils.
Cement and Concrete Research 162 (2022) 106990
[Open access: doi.org/10.1016/j.cemconres.2022.106990](https://doi.org/10.1016/j.cemconres.2022.106990)
86. Michel L, **Angst U**. Automated local electrochemical characterization on metals with complex shape and practice-related surface state.
Measurement 201 (2022) 111713
[Open access: doi.org/10.1016/j.measurement.2022.111713](https://doi.org/10.1016/j.measurement.2022.111713)
85. Zhang Z, Trtik P, Ren F, Schmid T, Dreimol Ch, **Angst U**. Dynamic effect of water penetration on steel corrosion in carbonated mortar: A neutron imaging, electrochemical, and modeling study.
CEMENT 9 (2022) 100043
[Open access: doi.org/10.1016/j.cement.2022.100043](https://doi.org/10.1016/j.cement.2022.100043)
84. Boschmann Käthler C, **Angst U**. Service life cost of selected design and repair strategies for concrete structures in chloride exposure: Particular consideration of 12% chromium steel.
Structural Concrete (2022)
[Open access: doi.org/10.1002/suco.202100784](https://doi.org/10.1002/suco.202100784)
83. **Angst U**, Isgor OB, Hansson CM, Sagüés A, Geiker MR. Beyond the chloride threshold concept for predicting corrosion of steel in concrete.
Applied Physics Reviews 9 (2022) 011321
[Open access: doi.org/10.1063/5.0076320](https://doi.org/10.1063/5.0076320)
82. Martinelli-Orlando F, **Angst U**. Monitoring corrosion rates with ER-probes – a critical assessment based on experiments and numerical modelling.
Corrosion Engineering Science and Technology (2022)
[Open access: doi.org/1080/1478422X.2022.2053036](https://doi.org/1080/1478422X.2022.2053036)
81. Wong H, **Angst U**, Geiker MR, Isgor OB, Elsener B, Michel A, Alonso MC, Correia MJ, Pacheco J, Gulikers J, Zhao Y, Criado M, Raupach M, Sørensen H, François R, Mundra S, Rasol M, Polder R. Methods for characterising the steel–concrete interface to enhance understanding of reinforcement corrosion: a critical review by RILEM TC 262-SCI
Materials and Structures 55 (2022) 124.
[Open access: doi.org/10.1617/s11527-022-01961-5](https://doi.org/10.1617/s11527-022-01961-5)
80. Zhang Z, Studer P, **Angst U**. Corrosion products at the steel-concrete interface: An SEM/BSE, EDX, and Raman spectroscopy study.
Journal of Microscopy (2022)
[Open access: doi.org/10.1111/jmi.13100](https://doi.org/10.1111/jmi.13100)
79. Aguilar Sanchez AM, Wangler T, Stefanoni M, **Angst U**. Microstructural examination of carbonated 3D printed concrete.
Journal of Microscopy (2022)
[Open access: doi.org/10.1111/jmi.13087](https://doi.org/10.1111/jmi.13087)
78. Michel L, Aguilar Sanchez AM, Silvestru VA, Ariza I, Taras A, **Angst U**. Corrosion behaviour of point-by-point wire and arc additively manufactured steel bars.
Materials and Corrosion (2022)
[Open access: doi.org/10.1002/maco.202112994](https://doi.org/10.1002/maco.202112994)
77. van Ede MC, Earls CJ, Fichtner A, **Angst U**. Electrochemical tomography as a non-destructive technique for corrosion rate measurements in localized corrosion of metals embedded in porous media.
npj Materials Degradation 5 (58) (2021)
[Open access: doi.org/10.1038/s41529-021-00209-x](https://doi.org/10.1038/s41529-021-00209-x)
76. Furcas FE, Lothenbach B, Isgor OB, Mundra S, Zhang Z, **Angst U**. Solubility and speciation of iron in cementitious systems.
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[Open access: doi.org/10.1016/j.cemconres.2021.106620](https://doi.org/10.1016/j.cemconres.2021.106620)
75. Zhang Z, **Angst U**. Effects of model boundary conditions on simulated drying kinetics and inversely determined liquid water permeability for cement-based materials.
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[Open access: doi.org/10.1080/07373937.2021.1961800](https://doi.org/10.1080/07373937.2021.1961800)
74. Boschmann Käthler C, Ebell G, Kessler S, Schiegg Y, Dauberschmidt Ch, **Angst U**. A comparison of methods to assess the resistance of reinforcing steel against chloride-induced corrosion in concrete – particular consideration of 12% chromium steel.
Materials and Corrosion (2021)
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73. Leupin OX, Smart NR, Zhang Z, Stefanoni M, **Angst U**, Papafotiou A, Diomidis N. Anaerobic corrosion of carbon steel in bentonite: an evolving interface. *Corrosion Science* 187 (2021) 109523 doi.org/10.1016/j.corsci.2021.109523
72. Silvestru VA, Ariza I, Vienne J, Michel L, Aguilar Sanchez AM, **Angst U**, Rust R, Gramazio F, Kohler M, Taras A. Performance under tensile loading of point-by-point wire and arc additively manufactured steel bars for structural components. *Materials & Design* 205 (2021) 109740 [Open access: doi.org/10.1016/j.matdes.2021.109740](https://doi.org/10.1016/j.matdes.2021.109740)
71. Boschmann Käthler C, Poulsen SL, Sørensen HE, **Angst U**. Investigations of accelerated methods for determination of chloride threshold values for reinforcement corrosion in concrete. *Sustainable and Resilient Infrastructure* (2021) 1905221 doi.org/10.1080/23789689.2021.1905221
70. Ren F, Zhou C, Zeng Q, Zhang Z, **Angst U**, Wang W. Quantifying the anomalous water absorption behavior of cement mortar in view of its physical sensitivity to water. *Cement and Concrete Research* 143 (2021) 106395 doi.org/10.1016/j.cemconres.2021.106395
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67. Bodie K, Brunner M, Pantic M, Walser S, Pfändler P, **Angst U**, Siegwart R, Nieto J. Active Interaction Force Control for Omnidirectional Aerial Contact-Based Inspection. *IEEE Transactions on Robotics* 37 (2021) 709–722. [Open access: doi:10.1109/TRO.2020.3036623](https://doi.org/10.1109/TRO.2020.3036623)
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65. Boschmann Käthler C, **Angst U**, Ebell G, Elsener B. Chloride-induced reinforcement corrosion in cracked concrete: the influence of time of wetness on corrosion propagation. *Corrosion Engineering Science and Technology* (2020) [doi:10.1080/1478422X.2020.1789371](https://doi.org/10.1080/1478422X.2020.1789371)
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62. Martinelli-Orlando F, Shi W, **Angst U**. Corrosion behavior of carbon steel in alkaline, deaerated solutions: influence of carbonate ions. *Journal of The Electrochemical Society* 167 (2020) 061503. doi.org/10.1149/1945-7111/ab7d44
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60. Vitaller AV, **Angst U**, Elsener B. Laboratory tests simulating corrosion in geothermal power plants – influence of service conditions. *Geothermal Energy: Science, Society, and Technology* 8 (2020) [Open access: doi.org/10.1186/s40517-020-00163-y](https://doi.org/10.1186/s40517-020-00163-y)
59. **Angst U**, Büchler M. A new perspective on measuring the corrosion rate of localized corrosion. *Materials and Corrosion* 71 (2020) 808–823. doi.org/10.1002/maco.201911467
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61. **Angst U.** Ensuring both eco-efficiency and durability of reinforced concrete through scientifically understanding corrosion of steel in carbonated concrete. **Invited lecture** at the conference EM4SS'21 – Engineered Materials for Sustainable Structures, 26–28 April 2021, Modena, Italy. Online conference.
60. Michel L, Aguilar Sanchez AM, Silvestru VA, Ariza I, Vienne J, Rust R, Gramazio F, Kohler M, Taras A, **Angst U.** Corrosion of additively manufactured steel components: electrochemical characterization

and microstructure of point-by-point wire and arc additive manufacturing bars. Swiss Corrosion Science Day, Zofingen, Switzerland, hybrid event, 26 April 2021.

59. **Angst U.** Size effects in corrosion of steel in concrete. **Invited plenary lecture** at the 2nd Int. Conf. on Construction Materials for a Sustainable Future (CoMS), 20–21 April 2021, Bled, Slovenia. Online conference.
- 58.* Yilmaz D, Häfliger S, Kaufmann W, **Angst U.** New conceptual approach combining the probabilistic nature of localised rebar corrosion and the load-deformation behaviour. CACRCS Days 2020: Capacity Assessment of Corroded Reinforced Concrete Structures, online conference. 1–4 December 2020. <https://doi.org/10.3929/ethz-b-000464554>
- 57.* Häfliger S, Yilmaz D, **Angst U.**, Kaufmann W. Corroded Tension Chord Model (CTCM) for concrete structures with locally corroded reinforcement. CACRCS Days 2020: Capacity Assessment of Corroded Reinforced Concrete Structures, online conference. 1–4 December 2020. <https://doi.org/10.3929/ethz-b-000458172>
- 56.* Zhang Z, **Angst U.** Modelling transport and precipitation of corrosion products in cementitious materials: A sensitivity analysis. The 7th International Symposium on Life-Cycle Civil Engineering (IALCCE 2020), Shanghai, China / online conference. 27–30 October 2020.
55. **Angst U.** Corrosion and how it can limit the life of reinforced concrete. **Invited lecture** at the Int. Conference on “Rethinking Concrete – Material Conventions in the Anthropocene, 22–23 October 2020, Princeton University, School of Architecture. Online conference.
54. Stefanoni M, Zhang Z, **Angst U.** Role of the concrete cover to suppress corrosion of steel in carbonated concrete. 74th RILEM Week and 40th Cement and Concrete Science Conference. Sheffield, UK / online conference. 31 August – 4 September 2020.
53. **Angst U.** Corrosion challenges in civil engineering infrastructures – examples from research at the corrosion laboratory at ETH Zurich. Swiss Corrosion Science Day, Thun, Switzerland, 3 March 2020.
52. **Angst U.** “Advances in Forecasting Reinforcing Steel Corrosion in Concrete”. Invited lecture at the 2020 Gordon Research Conference (GRC) on Advanced Materials for Sustainable Infrastructure Development, 23–27 February 2020 Ventura, California, USA.
51. Vitaller AV, Elsener B, **Angst U.** Corrosion Analysis of Deep Geothermal Fluids in Switzerland. In: SCCER-SoE Annual Conference 2019, Lausanne, Switzerland, September 3–4 2019.
50. Martinelli-Orlando F, Shi W, **Angst U.** Investigation of pH and oxygen variations on steel structure under cathodic protection. In: EUROCORR 2019 (European Corrosion Congress), Seville, Spain, September 2019.
49. Boschmann Käthler C, **Angst U.**, Elsener B. A database of critical chloride contents for fundamental understanding of corrosion initiation and service life modelling. In: EUROCORR 2019 (European Corrosion Congress), Seville, Spain, September 2019.
48. Vitaller AV, **Angst U.**, Elsener B. Analysis of corrosion with electrochemical techniques applied to geothermal power plants in Switzerland. In: EUROCORR 2019 (European Corrosion Congress), Seville, Spain, September 2019.
- 47.* Michel L, Stefanoni M, **Angst U.** Local electrochemical characterization – A novel approach to study initiation of chloride induced corrosion in reinforced concrete structures. In: Proc. Int. Conf. for Durable Concrete for Infrastructure under Severe Conditions, Smart Admixtures, Self-responsiveness and Nano-additions (LORCENIS), Gent, Belgium, 10-11 September 2019. Publisher: Magnel Laboratory for Concrete Research.
- 46.* Femenias Y, **Angst U.** Novel sensor for non-destructive durability monitoring in reinforced concrete. Paper No. we.4.a.3. In: SMAR 2019 – 5th Conf. on Smart Monitoring, Assessment and Rehabilitation of Civil Structures. Potsdam, Germany, August 2019. [Link to Proceedings](#)
- 45.* Pfändler P, Bodie K, **Angst U.**, Siegwart R. Flying corrosion inspection robot for corrosion monitoring of civil structures – First results. Paper No. we.4.a.6. In: SMAR 2019 – 5th Conf. on Smart Monitoring, Assessment and Rehabilitation of Civil Structures. Potsdam, Germany, August 2019. [Link to Proceedings](#)
- 44.* **Angst U.** Durable concrete structures: cracks & corrosion and corrosion & cracks. Keynote lecture and paper. Proc. 10th Int. Conf. on Fracture Mechanics of Concrete and Concrete Structures (FraMCoS-X), 24-26 June 2019, Bayonne, France. Eds. G. Pijaudier-Cabot, P. Grassl and C. La Borderie. [doi:10.21012/FC10.233307](https://doi.org/10.21012/FC10.233307)
- 43.* Bodie K, Brunner M, Pantic M, Walser S, Pfändler P, **Angst U.**, Siegwart R, Nieto J. An omnidirectional aerial manipulator for contact-based inspection, in: Proc. Int. Conf. 2019 Robotics: Science and Systems. 22-26 June 2019, Freiburg, Germany. <https://arxiv.org/abs/1905.03502v2>
- 42.* **Angst U.** Advances in durability monitoring of concrete structures, in: Proc. Int. Conf. Sustainable Materials, Systems and Structures (SMSS2019) – Durability, Monitoring and Repair of Structures,

- Eds. Baričević A, Rukavina MJ, Damjanović D, Guadagnini M. 20-22 March 2019, Rovinj, Croatia. RILEM Publications SARL. p. 572–579.
- 41.* Michel L, **Angst U**. Towards understanding corrosion initiation in concrete – Influence of local electrochemical properties of reinforcing steel, in: Int. Conf. on Concrete Repair, Rehabilitation and Retrofitting (ICCRRR). 10-12 November 2018, Cape Town, South Africa.
 - 40.* Boschmann Käthler C, **Angst U**, Elsener B. Towards understanding corrosion initiation in concrete – influence of local concrete properties in the steel-concrete interfacial zone, in: Int. Conf. on Concrete Repair, Rehabilitation and Retrofitting (ICCRRR). 10-12 November 2018, Cape Town, South Africa.
 - 39.* **Angst U**. The importance of the size effect in corrosion of steel in concrete for probabilistic service life modeling, in: Proc. Sixth International Symposium on Life-Cycle Civil Engineering, Eds. Caspeele R, Taerwe L, Frangopol DM. 28-31 October 2018, Ghent, Belgium.
 - 38.* Zhang Z, **Angst U**, Michel A. A framework for modeling corrosion-related degradation in reinforced concrete, in: Proc. Sixth International Symposium on Life-Cycle Civil Engineering, Eds. Caspeele R, Taerwe L, Frangopol DM. 28-31 October 2018, Ghent, Belgium.
 - 37.* Boschmann Käthler C, **Angst U**, Elsener B. Measuring critical chloride contents in structures and the influence on service life modeling, in: Proc. Sixth International Symposium on Life-Cycle Civil Engineering, Eds. Caspeele R, Taerwe L, Frangopol DM. 28-31 October 2018, Ghent, Belgium.
 36. **Angst U**. Consequences due to unawareness of diffusion potentials in cathodic protection, in: EUROCORR 2018 (European Corrosion Congress), Krakow, Poland, September 2018.
 - 35.* Stefanoni M, **Angst U**, Elsener B. Corrosion Challenges and Opportunities in Digital Fabrication of Reinforced Concrete, in: RILEM 1st International Conference on Concrete and Digital Fabrication. 10-12 September 2018, Zurich, Switzerland.
 34. **Angst U**. Battling infrastructure corrosion. Keynote lecture at the “4th International Conference on Service Life Design for Infrastructures & RILEM week 2018”. 26-29 August 2018, Delft, The Netherlands.
 33. **Angst U**, Zhang Z. The steel-concrete interface and its ambiguous role in corrosion in concrete, in: Conference celebrating the Laboratory of Construction Materials (EPFL) Centennial and Karen Scrivener 60th Birthday, 19-22 August 2018, Lausanne, Switzerland.
 - 32.* Zhang Z, **Angst U**, Michel A and Jensen MM, An image-based local homogenization method to model mass transport at the steel-concrete interface, in: Sixth Int. Conf. on the Durability of Concrete Structures, 18-20 July 2018, Leeds, UK.
 - 31.* **Angst U**. Die Korrosion unserer Infrastruktur. Opening lecture at 3-Länder-Korrosionstagung (in German), 12. April 2018, Dübendorf, Switzerland.
 - 30.* Femenias Y, **Angst U**, Elsener B. Durability monitoring of reinforced concrete. Paper No. 292. In: SMAR 2017 – 4th Conf. on Smart Monitoring, Assessment and Rehabilitation of Civil Structures. Zürich, Switzerland, September 2017. [Link to paper](#)
 - 29.* Büchler M, **Angst U**, Ackland B. Cathodic protection criteria: a discussion of their historic evolution. In: EUROCORR 2017 (European Corrosion Congress), Prague, Czech Republic, September 2017.
 - 28.* Boschmann Käthler C, **Angst U**, Larsen CK, Elsener B. Effect of cracks on chloride-induced corrosion of reinforcing steel in concrete. In: EUROCORR 2017 (European Corrosion Congress), Prague, Czech Republic, September 2017.
 27. **Angst U**. Corrosion in Construction: Challenges and opportunities in corrosion of steel in concrete. Keynote lecture at International Conference on Advances in Construction Materials and Systems (ICACMS-2017) & RILEM week 2017, 3-8 September 2017, Chennai, India.
 - 26.* **Angst U**. Forecasting the time to corrosion of reinforced concrete structures. The Corvallis Workshops – “Service Life Prediction of Concrete”, July 16-19, 2017, Corvallis, Oregon, USA.
 - 25.* Büchler M, Collet S, **Angst U**. The effect of coating defect distribution on buried steel pipelines on the effectiveness of cathodic protection. In: CEOCOR international Congress 2017 Luxembourg, 17–18 May 2017.
 - 24.* Bakalli M, Marazzani B, **Angst U**, Büchler M, Schlumpf J. Long-term field experience with an organic corrosion inhibitor demonstrating the potential to enhance the life of concrete structures. In: 45th Annual Convention of the Institute of Concrete Technology, Leeds, UK, 6 April 2017.
 - 23.* Hornbostel K, **Angst U**, Elsener B, Larsen CK, Geiker MR. Correlation between mortar resistivity and the partial process (anodic, cathodic and ohmic) of macro-cell reinforcement corrosion. In: Proc. fib Symposium, Cape Town, South Africa, 21–23 November 2016.
 - 22.* Büchler M, Ackland B, **Angst U**, The historic evolution of cathodic protection criteria. In: CEOCOR international Congress 2016 Ljubljana, Slovenia, 2016.

- 21.* **Angst U.** Chloride threshold values for corrosion initiation in concrete – a myth? **Keynote lecture** and paper. In: "Concrete Solutions - 6th Int. Conf. on Concrete Repair", Thessaloniki, Greece, 19-22 June 2016.
- 20.* Polder RB, **Angst U.**, Pacheco J, Peelen WHA. Propagation of pitting corrosion of steel in concrete: conceptual models for local cross section loss. In: "Concrete Solutions - 6th Int. Conf. on Concrete Repair", Thessaloniki, Greece, 19-22 June 2016.
- 19.* Stefanoni M, **Angst U.**, Elsener B. Innovative sample design for corrosion rate measurements in carbonated blended mortars. In: 11th International Concrete Sustainability Conference (2016 ICSC), Washington DC, 15–18 May 2016.
- 18.* **Angst U.**, Elsener B. Chloride threshold values in concrete – a look back and ahead. ACI Fall Convention, Denver, Colorado, USA, 8-12 November 2015.
- 17.* **Angst U.**, B uchler M. Corrosion rate measurements in concrete – a closer look at the linear polarization resistance method. In: 4th International Conference on Concrete Repair, Rehabilitation and Retrofitting (ICCRRR 2015), Leipzig, Germany, 05-07 October 2015.
- 16.* **Angst U.**, Elsener B. Forecasting chloride-induced reinforcement corrosion in concrete – effect of realistic reinforcement steel surface conditions. In: 4th International Conference on Concrete Repair, Rehabilitation and Retrofitting (ICCRRR 2015), Leipzig, Germany, 05-07 October 2015.
- 15.* Femenias YS, **Angst U.**, Elsener B. Monitoring chloride concentrations in concrete by means of Ag/AgCl ion-selective electrodes. In: 4th International Conference on Concrete Repair, Rehabilitation and Retrofitting (ICCRRR 2015), Leipzig, Germany, 05-07 October 2015.
14. **Angst U.**, Elsener B. A critical analysis of proposed test methods for measuring the chloride threshold value in reinforced concrete. In: EUROCORR 2014 (European Corrosion Congress), Pisa, Italy, September 2014.
- 13.* Elsener B, **Angst U.**, Leibbrandt A, Glauser O, Flatt RJ, Caprari G, Siegwart R. Climbing Robot for Corrosion Inspection and Monitoring of Reinforced and Post-tensioned Concrete Structures. In: Concrete Innovation Conference 2014 (CIC2014), Oslo, Norway, June, 2014.
- 12.* Geiker MR, De Weerd K, Hornbostel K, Kioumarsis MM, Hendriks M, Larsen CK, **Angst U.** Prediction of reinforcement corrosion in concrete structures. In: Concrete Innovation Conference 2014 (CIC2014), Oslo, Norway, June, 2014.
- 11.* Elsener B, **Angst U.** Potenzialfeldmessung – von der Inspektion bis zum Bauwerksmanagement. In: 1. Br uckenkolloquium – Beurteilung, Ert uchtigung und Instandsetzung von Br ucken, Ostfildern/Stuttgart, Germany, June, 2014. (in German).
- 10.* Leibbrandt A, Caprari G, **Angst U.**, Siegwart RY, Flatt RJ, Elsener B. Climbing robot for corrosion monitoring of reinforced concrete structures. In: 2nd International Conference on Applied Robotics for the Power Industry (CARPI), Zurich, Switzerland, 2012.
- 9.* Alonso MC, Sanchez M, **Angst U.**, and Garcia-Calvo JL. The effect of binder type on chloride threshold values for reinforced concrete. In: Concrete Repair, Rehabilitation and Retrofitting II. Proc. 3rd Int. Conf. on Concrete Repair, Rehabilitation and Retrofitting (ICCRRR), Cape Town, South Africa, 2012.
- 8.* **Angst U.**, Vennesland  , Larsen CK, and Elsener B. Chloride induced reinforcement corrosion: results from a laboratory study within the Norwegian COIN project. In: International Congress on Durability of Concrete, 18-21 June 2012, Trondheim, Norway. Eds: H. Justnes and S. Jacobsen, p. 116. ISBN 978-82-8208-031-6.
- 7.* Leibbrandt A, Caprari G, **Angst U.**, Siegwart RY, Flatt RJ, and Elsener B. Climbing Robot for Corrosion Monitoring of Reinforced Concrete Structures. In: 2nd International Conference on Applied Robotics for the Power Industry, 11-13 September 2012, Zurich, Switzerland.
- 6.* **Angst U.**, Vennesland  , Larsen CK, and Elsener B. Results from the Norwegian COIN project on chloride induced reinforcement corrosion in concrete. In: Nordic Concrete Research, Proceedings 21st NCR meeting, Helsinki, Finland. Norsk Betongforening, Oslo, 2011.
- 5.* **Angst U.**, Elsener B, Larsen CK, and Vennesland  . Considerations on the effect of sample size for the critical chloride content in concrete. In: 2nd International Symposium on Service Life Design for Infrastructures, vol. 1. Eds: van Breugel K et al. RILEM Publications SARL, 2010, p. 569. ISBN 978-2-35158-096-7.
- 4.* **Angst U.**, Larsen CK, Vennesland  , and Elsener B. Influence of casting direction on chloride-induced rebar corrosion. In: Concrete under Severe Conditions, Environment and Loading, Volume 1. Eds: Castro-Borges P et al. CRC Press, 2010, pp 359-366. ISBN 978-0-415-59316-8.
- 3.* **Angst U.**, Larsen CK, Vennesland  , and Elsener B. Monitoring the chloride concentration in the concrete pore solution by means of direct potentiometry. In: Concrete Solutions, Proc. Int. Conf. on

Concrete Solutions, Padua, Italy. Eds: Grantham M et al. CRC Press/Balkema, 2009, p. 401. ISBN 978-0-415-55082-6.

- 2.* **Angst U**, and Vennesland Ø. Critical chloride content in reinforced concrete – state of the art. In: Concrete Repair, Rehabilitation and Retrofitting II. Proc. 2nd Int. Conf. on Concrete Repair, Rehabilitation and Retrofitting (ICRRR), Cape Town, South Africa. Eds: Alexander MG et al. CRC Press/Balkema, The Netherlands, 2008, p. 149. ISBN 978-0-415-46850-3.
- 1.* **Angst U**, Vennesland Ø, Larsen CK, and Elsener B. Critical chloride content for corrosion in reinforced concrete. In: Nordic Concrete Research, Proceedings 20th NCR meeting, Bålsta, Sweden. Norsk Betongforening, Oslo, 2008, p. 52. ISBN 978-82-8208-007-1.

Invited lectures, seminars and webinars

27. Angst U. "Revolutionizing Condition Diagnosis and Predictive Forecasting: Synergizing Sensors, Robots, AI, and Predictive Modeling" **Invited keynote lecture** at the 1st Int. Conf. on Net-Zero Civil Infrastructures: Innovations in Materials, Structures, and Management Practices (Net-Zero Future 2024 Conference), 19–21 June 2024, Oslo, Norway.
26. Angst U. "Dauerhaftigkeit beim CO₂-armen Beton». **Invited presentation** at FORUM STRASSE (Fachtagung Strassenbau), 26 March 2024, Olten, Switzerland.
25. Angst U, Büchler M. "A Critical Review of the Science and Engineering of Cathodic Protection of Steel in Soil". **Invited webinar** hosted by Pipeline Research Council International, USA, 20 November 2023.
24. Angst U. "Steel corrosion in concrete – Achilles' heel for sustainable concrete?" **Invited keynote lecture** at the 16th Int. Congress on the Chemistry of Cement. 18–22 September 2023, Bangkok, Thailand.
23. Angst U. "Korrosion in Stahlbeton". **Invited webinar** hosted by suiccor, Zürich, 28 June 2023.
22. Angst U. "Grundlagen Korrosionsschutz im Stahlbau". **Invited webinar** hosted by Stahlbau Zentrum Schweiz (SZS), Zürich, 26 April 2023.
21. M. Pundir, Angst U, Kammer D. "How do corrosion-driven mechanisms change cementitious material's pore structure and impact the corrosion-driven fracture?" **Invited lecture** at the Minisymposium "Fracture and durability of concrete structures" at the 11th Conf. on Fracture Mechanics of Concrete and Concrete Structures (FramCoS-XI). 10–14 September 2023, Bangalore, India. (talk delivered by postdoc Dr. M. Pundir)
20. Angst U. "Measuring, understanding, and forecasting reinforcing steel corrosion in concrete". **Invited keynote lecture** at the 6th Int. Conf. on Concrete Repair, Rehabilitation and Retrofitting (ICRRR). 3–5 October 2022, Cape Town, South Africa.
19. Angst U. "Corrosion in Porous Media". **Invited lecture** at the 2022 Gordon Research Conference (GRC) on Aqueous Corrosion, 10-15 July 2022, Colby-Sawyer College, New London, USA. (lecture not delivered due to illness during the conference)
18. Angst U. "No net-zero without long-term corrosion predictions: a pore-scale perspective on relevant processes". **Invited lecture** at the Corvallis workshop – "Concrete Fit fur Purpose and Planet", June 21-26, 2022, Corvallis, Oregon, USA.
17. Angst U. "Cathodic protection of steel in soil and concrete". **Invited seminar** at the Glenn Department of Civil Engineering, Department of Materials Science and Engineering, Clemson University, USA. 1 April 2022.
16. Angst U. "Electrically isolated tendons and durability monitoring". **Invited lecture** at the annual corrosion conference by the Association of Czech and Slovak Corrosion Engineers (AKI). Tabor, Czech Republic/online, 20–22 Oct 2021.
15. Angst U. "Corrosion of steel in porous media – role of the interfacial zone". **Invited keynote lecture** at the 1st Corrosion and Materials Degradation Web Conference (CMDWC 2021), Online conference, 17–19 May 2021.
14. Angst U. "Ensuring both eco-efficiency and durability of reinforced concrete through scientifically understanding corrosion of steel in carbonated concrete". **Invited lecture** at the conference EM4SS'21 – Engineered Materials for Sustainable Structures, 26-28 April 2021, Online conference, Modena, Italy.
13. Angst U. "Size effects in corrosion of steel in concrete". **Invited plenary lecture** at the 2nd Int. Conf. on Construction Materials for a Sustainable Future (CoMS), 20-21 April 2021, Bled, Slovenia. Online conference.
12. Angst U. "Corrosion and electrochemistry of steel in concrete". **Invited seminar** in RILEM's online ROC&TOK webinar series, 1 April 2021. <https://www.youtube.com/watch?v=Ngk8igt3cyY>
11. Angst U. "Corrosion and how it can limit the life of reinforced concrete". **Invited lecture** at the Int. Conference on "Rethinking Concrete – Material Conventions in the Anthropocene, 22-23 October 2020, Princeton University, School of Architecture. Online conference.
10. Angst U. "Advances in Forecasting Reinforcing Steel Corrosion in Concrete". **Invited lecture** at the 2020 Gordon Research Conference (GRC) on Advanced Materials for Sustainable Infrastructure Development, 23-27 February 2020 Ventura, California, USA.
9. Angst U. "Durable concrete structures: cracks & corrosion and corrosion & cracks". **Keynote lecture** at the 10th International Conference on Fracture Mechanics of Concrete and Concrete Structures (FramCoS-X), 24-26 June 2019, Bayonne, France.

8. Angst U. "Size effects in corrosion of steel in concrete". **Seminar** at the Department of Civil and Environmental Engineering, Imperial College, London, UK. 20 June 2019.
7. Angst U. "Corrosion of steel in concrete – challenges and opportunities". **Seminar** at the Electrochemistry Laboratory (LEC) at the Paul-Scherrer Institute (PSI), Villigen, Switzerland. 6 March 2019.
6. Angst U. "Corrosion of steel in concrete – challenges and opportunities". **Seminar** at the Dep. of Materials Science & Engineering, University of Virginia, Charlottesville, USA. 11 October 2018.
5. Angst U. "Battling infrastructure corrosion". **Keynote lecture** at the "4th International Conference on Service Life Design for Infrastructures & RILEM week 2018". 26-29 August 2018, Delft, The Netherlands.
4. Angst U. "Die Korrosion unserer Infrastruktur". **Opening lecture** at 3-Länder-Korrosionstagung (in German), 12. April 2018, Dübendorf, Switzerland.
3. Angst U. "Corrosion in Construction: Challenges and opportunities in corrosion of steel in concrete". **Keynote lecture** at "International Conference on Advances in Construction Materials and Systems (ICACMS-2017) & RILEM week 2017, 3-8 September 2017, Chennai, India. Watch online: <https://www.youtube.com/watch?v=dfmxxrEqvhZc>
2. Angst U. "Forecasting the time to corrosion of reinforced concrete structures". **Invited lecture** at "The Corvallis Workshops – Service Life Prediction of Concrete", July 16-19, 2017, Corvallis, Oregon, USA.
1. Angst U. "Chloride threshold values for corrosion initiation in concrete – a myth?" **Keynote lecture** at "Concrete Solutions – 6th Int. Conf. on Concrete Repair", Thessaloniki, Greece, 19-22 June 2016.

Patents

- 2023 **Patent application** filed (no. PCT/EP2023/072185, WO2024/037966A1). “Method and device for assessing corrosion phenomena”. Inventors: Lukas Bircher, Ueli Angst, Patrick Pfändler.
- 2021 **Patent application** filed (no. PCT/EP2021/056448, WO2021185717A1). “Sensor assembly for determining properties of a concrete structure”. Inventors: Yurena Segui Femenias, Ueli Angst.

Other publications

- **Open access data collection on “Literature-based data on pore solution compositions of cementitious systems”** (<https://doi.org/10.3929/ethz-b-000543461>).
- **Open access database on values for critical chloride content** of steel in concrete and various parameters from material characterization. The data base includes the raw data measured in our laboratory (doi.org/10.3929/ethz-b-000282371) as well as an interactive online visualization tool: <https://critical-chloride-content.ethz.ch/>