



Justin DIRRENBARGER

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- EXPERTISE** ◇ Mechanics of materials, additive manufacturing, architected materials, modelling
- PROFESSIONAL EXPERIENCE**
- ◇ Associate Professor, Conservatoire National des Arts et Métiers, Paris, France (since Sep. 2013)
 - ◇ Co-founder & scientific advisor, XtreeE, Paris, France (since Sep. 2015)
Technological solutions for large-scale additive manufacturing
 - ◇ Research Engineer, Centre des Matériaux, MINES-ParisTech, Evry, France (Oct. 2009 – June 2013)
Computational homogenisation of mechanical and thermal properties of architected materials
 - ◇ Research Engineer, Carbon Services, Schlumberger Ltd., Clamart, France (Feb. – Aug. 2009)
Study of Portland cement carbonation in the context of CO₂ sequestration
 - ◇ Research Engineer, EPFL, Lausanne, Switzerland (Mar. – Aug. 2008)
Modeling of the particle size distribution effect on mechanical properties in cement paste
- EDUCATION**
- ◇ HDR in Engineering, Sorbonne Université, Paris (2018)
 - ◇ Ph.D. in Materials Science & Engineering, MINES-ParisTech, Paris (2012)
Supervised by Prof. S. Forest and Prof. D. Jeulin
 - ◇ Diplôme d'ingénieur in Materials Science & Engineering, Polytech' Paris-Sud, Orsay (2009)
 - ◇ M.Sc. in Materials Science & Engineering, Université Paris-Sud, Orsay (2009)
- AWARDS**
- ◇ FEMS Communication Award for Excellence in MSE, 1st runner-up (Jul. 2018)
 - ◇ Jean Rist medal from SF2M (Oct. 2017)
 - ◇ French-Australia Science Innovation Collaboration (FASIC) grant (Dec. 2016)
 - ◇ National Young Academic Researcher Grant (ANR JCJC) (2015 – 2020)
 - ◇ Doctoral scholarship from MINES-ParisTech (Oct. 2009 – Dec. 2012)
 - ◇ Research fellowship from EPFL, Lausanne, Switzerland (Mar. – Aug. 2008)
- SCIENTIFIC OUTPUT**
- ◇ 20 articles in international peer-reviewed journals
 - ◇ 7 papers in international peer-reviewed conference proceedings
 - ◇ 8 scholarly book chapters, 1 patent
 - ◇ 40 invited lectures out of 95+ oral communications, seminars, workshops, etc.
- RESEARCH PROJECTS**
- ◇ ANR-funded : SCOLASTIC (JCJC, 250k€, 2016-2021), MAX-OASIS (175k€, 2020-2024), ALMARIS (160k€, 2016-2020)
 - ◇ CNRS-funded : PEPS INSIS (6k€, 2019), APHORISME (50k€, F2M-CNRS, 2014-2015)
 - ◇ Other projects : R&T CNES (46k€, 2017-2019), DEMOCRITE (120k€, HÉSAM Synergie, 2014-2015)
- ACADEMIC RESPONSIBILITIES**
- ◇ Supervision of 6 PhD candidates (3 defended, 3 on-going), 3 postdocs, and 7 MSc students
 - ◇ Head of the materials engineering graduate program (MSc) at Cnam (2017-)
 - ◇ Elected board member at the academic council of Cnam (2018-)
 - ◇ Member of Mécamat (2010- elected board member since 2016), Euromech (2010-), and SF2M (2011- education committee member).

Scientific output

Justin DIRRENBARGER, Associate Professor, Cnam

September 29, 2019

A Refereed journal articles (20)

- A20. F. Albertini, **J. Dirrenberger**, A. Molotnikov, and C. Sollogoub. Computational investigation of the effective mechanical behavior for 3D pre-buckled auxetic lattices. *ASME Journal of Applied Mechanics*, volume **86**, 2019, 111003 <https://doi.org/10.1115/1.4044542>
- A19. F. dell’Isola, P. Seppecher, M. Spagnuolo, E. Barchiesi, F. Hild, T. Lekszycki, I. Giorgio, L. Placidi, U. Andreaus, M. Cuomo, S.R. Eugster, A. Pfaff, K. Hoschke, R. Langkemper, E. Turco, R. Sarikaya, A. Misra, M. De Angelo, F. D’Annibale, A. Bouterf, X. Pinelli, A. Misra, B. Desmorat, M. Pawlikowski, C. Dupuy, P. Peyre, M. Laudato, L. Manzari, P. Göransson, C. Hesch, S. Hesch, P. Franciosi, **J. Dirrenberger**, F. Maurin, Z. Vangelatos, C. Grigoropoulos, V. Melissinaki, M. Farsari, W. Muller, B.E. Amali, C. Liebold, G. Ganzosch, P. Harrison, R. Drobnicki, L. Igumnov, F. Alzahrani, and T. Hayat. Advances in pantographic structures: design, manufacturing, models, experiments and image analyses. *Continuum Mechanics and Thermodynamics*, volume **31**, 2019, pp. 1231-1282 <https://doi.org/10.1007/s00161-019-00806-x>
- A18. M. De Angelo, M. Spagnuolo, F. D’Annibale, A. Pfaff, K. Hoschke, A. Misra, C. Dupuy, P. Peyre, **J. Dirrenberger**, and M. Pawlikowski. The macroscopic behavior of pantographic sheets depends mainly on their microstructure: experimental evidence and qualitative analysis of damage in metallic specimens. *Continuum Mechanics and Thermodynamics*, volume **31**, 2019, pp. 1181-1203 <https://doi.org/10.1007/s00161-019-00757-3>
- A17. Z.P. Wang, L.H. Poh, Y. Zhu, **J. Dirrenberger**, and S. Forest. Systematic design of tetra-petals auxetic structures with stiffness constraint. *Materials and Design*, volume **170**, 2019, n. 107669 <https://doi.org/10.1016/j.matdes.2019.107669>
- A16. P. Lapouge, **J. Dirrenberger**, F. Coste, and M. Schneider. Laser heat treatment of martensitic steel and dual-phase steel with high martensite content. *Materials Science and Engineering A*, volume **752**, 2019, pp. 128-135 <https://doi.org/10.1016/j.msea.2019.03.016>
- A15. E. Ernault, **J. Dirrenberger**, E. Richaud, and B. Fayolle. Prediction of stress induced by heterogeneous oxidation in epoxy/amine networks. *Polymer Degradation and Stability*, volume **162**, 2019, pp. 112-121 <https://doi.org/10.1016/j.polydegradstab.2019.02.019>
- A14. R. Duballet, O. Baverel, and **J. Dirrenberger**. Space truss masonry walls with robotic mortar extrusion. *Structures*, volume **18**, 2019, pp.41-47 <http://doi.org/10.1016/j.istruc.2018.11.003>
- A13. S. Yang, **J. Dirrenberger**, E. Monteiro, and N. Ranc. Representative volume element size determination for viscoplastic and dissipative properties in polycrystalline materials. *International Journal of Solids and Structures*, volume **158**, 2019, pp. 210-219 <https://doi.org/10.1016/j.ijsolstr.2018.09.011>
- A12. R.A. Buswell, W.R. Leal de Silva, S.Z. Jones, and **J. Dirrenberger**. 3D printing using concrete extrusion: A roadmap for research. *Cement and Concrete Research*, volume **112**, 2018, pp. 37-49 <http://doi.org/10.1016/j.cemconres.2018.05.006>
- A11. R. Duballet, O. Baverel, and **J. Dirrenberger**. Classification of building systems for concrete 3D printing. *Automation in Construction*, volume **83**, 2017, pp. 247-258 <http://doi.org/10.1016/j.autcon.2017.08.018>
- A10. N. Torabian, V. Favier, **J. Dirrenberger**, F. Adamski, S. Ziaei-Rad, and N. Ranc. Correlation of the high and very high cycle fatigue response of ferrite based steels with strain rate-temperature conditions. *Acta Materialia*, volume **134**, 2017, pp. 40-52 <http://doi.org/10.1016/j.actamat.2017.05.064>

- A9. Z.P. Wang, L.H. Poh, **J. Dirrenberger**, S. Forest, and Y. Zhu. Isogeometric shape optimization of smoothed petal auxetic structures via computational periodic homogenization. *Computational Methods in Applied Mechanics and Engineering*, volume **323**, 2017, pp. 250-271 <http://doi.org/10.1016/j.cma.2017.05.013>
- A8. N. Torabian, V. Favier, S. Ziaei-Rad, **J. Dirrenberger**, F. Adamski, and N. Ranc. Thermal Response of DP600 Dual-Phase Steel under Ultrasonic Fatigue Loading. *Materials Science and Engineering: A*, volume **677**, 2016, pp. 97-105 <http://dx.doi.org/10.1016/j.msea.2016.09.025>
- A7. A. Bironeau, **J. Dirrenberger**, C. Sollogoub, G. Miquelard-Garnier and S. Roland. Evaluation of morphological representative sample sizes for nanolayered polymer blends. *Journal of Microscopy*, volume **264**(1), 2016, pp.48-58 <http://dx.doi.org/10.1111/jmi.12415>
- A6. C. Gosselin, R. Duballet, Ph. Roux, N. Gaudillière, **J. Dirrenberger** and Ph. Morel. Large-Scale 3D Printing of Ultra-High Performance Concrete– A New Processing Route for Architects and Builders. *Materials & Design*, volume **100**, 2016, pp. 102-109 <http://dx.doi.org/10.1016/j.matdes.2016.03.097>
- A5. N. Auffray, **J. Dirrenberger** and G. Rosi. A complete description of bi-dimensional anisotropic strain-gradient elasticity. *International Journal of Solids and Structures*, volume **69-70**, 2015, pp. 195-206 <http://dx.doi.org/10.1016/j.ijsoistr.2015.04.036>
- A4. **J. Dirrenberger**, S. Forest and D. Jeulin. Towards gigantic RVE sizes for stochastic fibrous networks. *International Journal of Solids and Structures*, volume **51**(2), 2014, pp. 359-376 <http://dx.doi.org/10.1016/j.ijsoistr.2013.10.011>
- A3. **J. Dirrenberger**, S. Forest and D. Jeulin. Effective elastic properties of auxetic microstructures: anisotropy and structural applications. *International Journal of Mechanics and Materials in Design*, volume **9**(1), 2013, pp. 21-33 <http://dx.doi.org/10.1007/s10999-012-9192-8>
- A2. **J. Dirrenberger**, S. Forest and D. Jeulin. Elastoplasticity of auxetic materials. *Computational Materials Science*, volume **64**, 2012, pp. 57-61 <http://dx.doi.org/10.1016/j.commatsci.2012.03.036>
- A1. **J. Dirrenberger**, S. Forest, D. Jeulin and C. Colin. Homogenization of periodic auxetic materials. *Procedia Engineering*, volume **10**, 2011, pp. 1852-1857 <http://dx.doi.org/10.1016/j.proeng.2011.04.307>

B Refereed conference proceedings (7)

- R7. R. Duballet, O. Baverel, and **J. Dirrenberger**. Treillis spatiaux en extrusion robotisée de matériaux cimentaires. *DiXite3dPrint : Fabrication Additive pour la Construction. Quelle Actualité Nationale*, Ecole des Ponts ParisTech, Jan 2019, Champs-sur-Marne, France <https://hal-enpc.archives-ouvertes.fr/hal-02119339>
- R6. N. Gaudillière, C. Bouyssou, A. Mallet, P. Roux, M. Zakeri, R. Duballet, and **J. Dirrenberger**. Bénéfices temps et matière dans le recours au processus d'impression 3D béton pour des applications dans le domaine de la construction. *DiXite3dPrint : Fabrication Additive pour la Construction. Quelle Actualité Nationale*, Ecole des Ponts ParisTech, Jan 2019, Champs-sur-Marne, France <https://hal-enpc.archives-ouvertes.fr/hal-02119509>
- R5. **J. Dirrenberger**. From Architected Materials to the Development of Large-scale Additive Manufacturing. *SPOOL*, volume **4**(1), 2017, ISSN 2215-0900 <https://doi.org/10.7480/spool.2017.1.1910>
- R4. N. Torabian, V. Favier, S. Ziaei-Rad, F. Adamski, **J. Dirrenberger** and N. Ranc. Self-Heating Measurements for a Dual-Phase Steel under Ultrasonic Fatigue Loading for Stress Amplitudes below the Conventional Fatigue Limit. *Procedia Structural Integrity*, volume **2**, 2016, pp. 1191-1198 <http://dx.doi.org/10.1016/j.prostr.2016.06.152>
- R3. G. Rosi, N. Auffray and **J. Dirrenberger**. Wave propagation in the framework of strain gradient continua: the example of hexachiral materials. *22ème Congrès Français de Mécanique*, Lyon, France, August 2015 <http://hdl.handle.net/2042/57379>
- R2. N. Gaudillière, **J. Dirrenberger**, O. Baverel and C. Sollogoub. Additive Manufacturing for the Development of an Assembling System for Gridshells. In *What's the Matter? Materiality and Materialism at the Age of Computation*, 2014, ed. M. Voyatzaki, pp. 195-210, ISBN: 978-960-89320-6-7

- R1. **J. Dirrenberger**, S. Forest and D. Jeulin. Effective properties of auxetics made using selective laser melting. *Matériaux & Techniques*, volume **100**, S1, 2012, pp. 172-173

C Scholarly book chapters (8)

- B8. K. Kuzmenko, N. Gaudillière, A. Feraille, **J. Dirrenberger**, and O. Baverel. Assessing the Environmental Viability of 3D Concrete Printing Technology. In *Impact: Design With All Senses*, eds. C. Gengnagel, et al. Springer, 2020, pp. 517-528 https://doi.org/10.1007/978-3-030-29829-6_40
- B7. N. Gaudillière, R. Duballet, C. Bouyssou, A. Mallet, Ph. Roux, M. Zakeri, and **J. Dirrenberger**. Building Applications Using Lost Formworks Obtained Through Large-Scale Additive Manufacturing of Ultra-High-Performance Concrete. In *3D Concrete Printing Technology*, eds. J.G. Sanjayan, A. Nazari, and B. Nematollahi. Butterworth-Heinemann, 2019, pp. 37-58 <https://doi.org/10.1016/B978-0-12-815481-6.00003-8>
- B6. **J. Dirrenberger**, S. Forest and D. Jeulin. Computational homogenization of architected materials. In *Architected Materials in Nature and Engineering*, eds. Y. Estrin, Y. Bréchet, J. Dunlop, P. Fratzl. Springer Series in Materials Science, volume **282**, Springer, 2019, pp. 89-139 https://doi.org/10.1007/978-3-030-11942-3_4
- B5. N. Gaudillière, R. Duballet, C. Bouyssou, A. Mallet, Ph. Roux, M. Zakeri, and **J. Dirrenberger**. Large-Scale Additive Manufacturing of Ultra-High-Performance Concrete of Integrated Formwork for Truss-Shaped Pillars. In *Robotic Fabrication in Architecture, Art and Design 2018*, eds. J. Willmann, P. Block, M. Hutter, K. Byrne, T. Schork. ROBARCH 2018. Springer, 2019, pp. 459-472 http://dx.doi.org/10.1007/978-3-319-92294-2_35
- B4. **J. Dirrenberger**. From Architected Materials to Large-Scale Additive Manufacturing. In *Robotic Building*, ed. H. Bier. Springer Series in Adaptive Environments, Springer International Publishing, 2018, pp. 79-96 http://dx.doi.org/10.1007/978-3-319-70866-9_4
- B3. R. Duballet, O. Baverel, and **J. Dirrenberger**. Design of Space Truss Based Insulating Walls for Robotic Fabrication in Concrete. In *Humanizing Digital Reality*, eds. K. De Rycke, et al., Springer, Singapore, 2018, pp. 453-461 http://dx.doi.org/10.1007/978-981-10-6611-5_39
- B2. N. Torabian, V. Favier, S. Ziaei-Rad, **J. Dirrenberger**, F. Adamski and N. Ranc. Calorimetric Studies and Self-Heating Measurements for a Dual-Phase Steel Under Ultrasonic Fatigue Loading. In *Fatigue and Fracture Test Planning, Test Data Acquisitions, and Analysis*, ASTM STP1598, Z. Wei, K. Nikbin, P. McKeighan, and G. Harlow, Eds., ASTM International, West Conshohocken, PA, 2017, pp. 81-93 <http://dx.doi.org/10.1520/STP159820160053>
- B1. B. Lecampion, J. Vanzo, F.J. Ulm, B. Huet, C. Gernay, I. Khalfallah and **J. Dirrenberger**. Evolution of Portland cement mechanical properties exposed to CO₂-rich fluids: Experimental investigation at different scales. In *MPPS 2011, Symposium on Mechanics and Physics of Porous Solids : A tribute to Pr. Olivier Coussy, Marne-la-Vallée, 18-20 avril 2011*, 2011, 406p <http://hal.archives-ouvertes.fr/hal-00595113/>

D Patent (1)

- P1. **J. Dirrenberger**, K. Mathis, and F. Masson. Amortisseur auxétique. Patent number FR3071290, 19 September 2017.

E Refereed conference lectures (40)

- C40. A.-E. Viard, **J. Dirrenberger**, and S. Forest. Propagating material instabilities in periodic media. *29th International Workshop on Computational Mechanics of Materials (IWCMM29)*, Dubrovnik, Croatia, September 2019.

- C39. F. Ongaro, K. Mathis, F. Masson, and **J. Dirrenberger**. Architected materials for space applications: a computational tool for the parametric optimization of a three-dimensional lattice subjected to stiffness constraints. *8th European Conference for Aeronautics and Space Sciences (EUCASS 2019)*, Madrid, Spain, July 2019.
- C38. **J. Dirrenberger**, S. Yang, E. Monteiro, and N. Ranc. Representative volume element size determination for viscoplastic polycrystalline materials. *4èmes Journées Matériaux Numériques*, **Invited keynote lecture**, Amboise, France, June 2019.
- C37. A.-E. Viard, **J. Dirrenberger**, and S. Forest. Propagating material instabilities in periodic media. *148th Annual Meeting and Exhibition TMS2019 Conference*, San Antonio, TX, USA, March 2019.
- C36. P. Lapouge, **J. Dirrenberger**, and M. Schneider. Architected steel sheets through localized laser processing. *148th Annual Meeting and Exhibition TMS2019 Conference*, San Antonio, TX, USA, March 2019.
- C35. **J. Dirrenberger**, S. Yang, E. Monteiro, and N. Ranc. Representative volume element size determination for viscoplastic polycrystalline aggregates. *SES 2018 - 55th Annual Technical meeting*, Madrid, Spain, October 2018.
- C34. **J. Dirrenberger**, F. Albertini, C. Sollogoub, and A. Molotnikov. Architected hybrid auxetic lattice structures. *IUTAM Symposium on Architected Materials Mechanics*, Chicago, IL, USA, September 2018.
- C33. **J. Dirrenberger**. Large-scale additive manufacturing: Challenges and opportunities for innovation. *1st RILEM International Conference on Concrete and Digital Fabrication*, **Invited keynote lecture**, Zurich, Switzerland, September 2018.
- C32. N. Gaudillière, R. Duballet, C. Bouyssou, A. Mallet, Ph. Roux, M. Zakeri, and **J. Dirrenberger**. Large-Scale Additive Manufacturing of Ultra-High-Performance Concrete of Integrated Formwork for Truss-Shaped Pillars. *ROB-ARCH 2018*, Zurich, Switzerland, September 2018.
- C31. **J. Dirrenberger**. Bio-inspired hybrid architected materials obtained through additive manufacturing. *Euromat Junior Conference, FEMS Communication Award for Excellence in MSE lecture*, **Invited lecture**, Budapest, Hungary, July 2018.
- C30. **J. Dirrenberger**, S. Yang, E. Monteiro, and N. Ranc. Representative volume element size determination for viscoplastic polycrystalline materials. *10th European Solid Mechanics Conference*, Bologna, Italy, July 2018.
- C29. **J. Dirrenberger**, F. Albertini, C. Sollogoub, and A. Molotnikov. Bio-inspired architected hybrid lattice structures. *International workshop in honor of Dominique Jeulin, Physics and mechanics of random structures: from morphology to material properties*, **Invited lecture**, Oléron, France, June 2018.
- C28. **J. Dirrenberger**, S. Yang, E. Monteiro, and N. Ranc. Representative volume element size determination for viscoplastic polycrystalline materials. *Engineering Mechanics Institute Conference 2018*, Cambridge, MA, USA, May 2018.
- C27. **J. Dirrenberger**, S. Yang, E. Monteiro, and N. Ranc. Representative Volume Element Size for Viscoplastic Properties in Polycrystalline Copper. *16th European Mechanics of Materials Conference*, Nantes, France, March 2018.
- C26. **J. Dirrenberger**. Large-scale additive manufacturing as a disruptive force in the construction industry. *1st Asia-Pacific International Conference on Additive Manufacturing*, **Invited lecture**, Melbourne, Australia, December 2017.
- C25. **J. Dirrenberger**, Y. Qi, and A. Molotnikov. Preliminary results on the mechanical behavior of hybrid architected lattice structures. *Journées annuelles de la SF2M*, **Jean Rist medal Invited keynote lecture**, Lyon, France, October 2017.
- C24. E. Ernault, **J. Dirrenberger**, E. Richaud, and B. Fayolle. Embrittlement and stress-strain field induced by oxidation: case of epoxy amine networks. *32nd PDDG (Polymer Degradation Discussion Group) conference*, Taormina, Italy, September 2017.
- C23. S. Yang, N. Ranc, E. Monteiro and **J. Dirrenberger**. Intrinsic dissipation process during very high cycle fatigue tests on pure Copper. *7th International Conference on Very High Cycle Fatigue*, Dresden, Germany, July 2017.

- C22. **J. Dirrenberger**, Y. Qi, and A. Molotnikov. Bio-inspired architected hybrid lattice structures. *5th International Conference on Material Modelling (ICMM5)*, Rome, Italy, June 2017.
- C21. Z.P. Wang, L.H. Poh, **J. Dirrenberger**, Y. Zhu, and S. Forest. Designing Smoothed Petal Auxetic Structures Using Isogeometric Shape Optimization. *5th International Conference on Material Modelling*, Rome, Italy, June 2017.
- C20. E. Ernault, **J. Dirrenberger**, E. Richaud, and B. Fayolle. Simulation du comportement chemo-mécanique de réseaux époxy lors de leur oxydation hétérogène. *27th DEPOS (Déformation des Polymères Solides) conference*, Dourdan, France, March 2017.
- C19. A. Bironeau, **J. Dirrenberger**, C. Sollogoub, G. Miquelard-Garnier and S. Roland. Evaluation of morphologically representative sample sizes for nanolayered polymer blends. *15th European Mechanics of Materials Conference*, Brussels, Belgium, September 2016.
- C18. **J. Dirrenberger**. Representative Volume Element Size Determination for Viscoplastic Properties in Polycrystalline Aggregates. *10th Mechanics of Time-Dependent Materials Conference*, Paris, France, May 2016.
- C17. **J. Dirrenberger**, S. Forest and D. Jeulin. Towards Gigantic RVE sizes for 3D stochastic fibrous networks. *1st European-Latin-American Conference of Theoretical and Applied Mechanics*, La Havane, Cuba, February 2016.
- C16. N. Auffray, G. Rosi and **J. Dirrenberger**. Wave propagation in the framework of strain gradient continua. *French-German workshop on Extended continuum theories for the numerically efficient modeling of multi-scale phenomena*, Ruhr-Universität Bochum, Germany, September 2015.
- C15. G. Rosi, N. Auffray and **J. Dirrenberger**. Wave propagation in the framework of strain gradient continua: the example of hexachiral materials. *22ème Congrès Français de Mécanique*, Lyon, France, August 2015.
- C14. **J. Dirrenberger**, S. Forest and D. Jeulin. Towards Gigantic RVE sizes for 3D stochastic fibrous networks. *9th European Solid Mechanics Conference*, Leganés-Madrid, Spain, July 2015.
- C13. G. Rosi, N. Auffray and **J. Dirrenberger**. Wave Propagation in Hexachiral Lattices Modeled as Strain Gradient Continua. *9th European Solid Mechanics Conference*, Leganés-Madrid, Spain, July 2015.
- C12. **J. Dirrenberger**. Representative Volume Element Size for Viscoplastic Properties in Face-Centered Cubic Metals. *4th International Conference on Material Modeling*, Berkeley, California, May 2015.
- C11. **J. Dirrenberger**. Mécanique des matériaux auxétiques. **Invited lecture**, *Mini-symposium « Mécanique des matériaux architecturés »*, *12ème Colloque National en Calcul de Structures*, Giens, France, May 2015.
- C10. **J. Dirrenberger**, L. Callen, V. Favier and O. Castelnau. Computational Investigation of Micro-Macro Rate Sensitivity Equivalence in Polycrystalline Copper. *24th International Workshop on Computational Mechanics of Materials*, Madrid, Spain, October 2014.
- C9. **J. Dirrenberger**. From Materials Engineering to the Computational Development of Architected Materials. *What's the Matter- Materiality and Materialism at the Age of Computation*, **Invited keynote lecture**, Barcelona, Spain, September 2014.
- C8. N. Gaudillière, **J. Dirrenberger**, O. Baverel and C. Sollogoub. Additive Manufacturing for the Development of an Assembling System for Gridshells. *What's the Matter? Materiality and Materialism at the Age of Computation*, Barcelona, Spain, September 2014.
- C7. **J. Dirrenberger**, L. Callen, V. Favier and O. Castelnau. RVE size for viscoplastic properties in polycrystalline aggregates. *14th European Mechanics of Materials Conference*, Gothenburg, Sweden, August 2014.
- C6. **J. Dirrenberger**, S. Forest and D. Jeulin. RVE size determination for 3D stochastic fibrous networks. *Journées Matériaux Numériques*, Loches, France, February 2013.
- C5. **J. Dirrenberger**, S. Forest and D. Jeulin. Effective properties of auxetics made using selective laser melting. *Journées annuelles de la SF2M*, **Invited keynote lecture**, Paris, France, October 2012.
- C4. **J. Dirrenberger**, S. Forest and D. Jeulin. Statistical determination of RVE sizes and effective properties for stochastic fibrous networks. *6th European Congress on Computational Methods in Applied Sciences and Engineering*, Vienna, Austria, September 2012.

- C3. **J. Dirrenberger**, S. Forest and D. Jeulin. Modelling of auxetic materials with periodic microstructure. *8th European Solid Mechanics Conference*, Graz, Austria, July 2012.
- C2. **J. Dirrenberger**, S. Forest and D. Jeulin. Elastoplasticity of auxetic materials. *21st International Workshop on Computational Mechanics of Materials*, Limerick, Ireland, August 2011.
- C1. **J. Dirrenberger**, S. Forest, D. Jeulin and C. Colin. Homogenization of periodic auxetic materials. *11th International Conference on Mechanical Behaviour of Materials*, Como, Italy, June 2011.

F Invited lectures, seminars, workshops, etc. (57)

- L57. **J. Dirrenberger**. Vers une approche intégrée pour le développement de matériaux architecturés. **Invited lecture**, *IRDL laboratory*, Lorient, France, May 2019.
- L56. A.-E. Viard, **J. Dirrenberger**, and S. Forest. Propagating material instabilities in periodic media. *Workshop on Nonlinear Instabilities and Localization in Materials*, Arpino, Italy, April 2019.
- L55. **J. Dirrenberger**. Towards an integrated approach for the development of architected materials. *Habilitation defense*, Paris, France, December 2018.
- L54. **J. Dirrenberger**, S. Yang, E. Monteiro, and N. Ranc. Representative volume element size determination for viscoplastic polycrystalline materials. *DGM workshop on micromechanics*, Wuppertal, Germany, December 2018
- L53. **J. Dirrenberger**. Additive manufacturing for architecture materials. **Invited lecture** *Rencontres Franciliennes de Mécanique*, Dammarie-les-Lys, France, June 2018.
- L52. R. Duballet, O. Baverel, and **J. Dirrenberger**. Large-scale additive manufacturing and architecture. **Invited lecture** *Rencontres Franciliennes de Mécanique*, Dammarie-les-Lys, France, June 2018.
- L51. F. dell'Isola, M. Spagnuolo, C. Dupuy, P. Peyre, and **J. Dirrenberger**. Pantographic structures, an example of collaboration between France and Italy. *Réseau National de Connaissances*, **Invited lecture**, Paris, France, February 2018.
- L50. **J. Dirrenberger**, S. Forest, D. Jeulin, F. Willot, and M. Faessel. Representative Volume Element Size Determination for Elasticity & Viscoplasticity. **Invited lecture** *Colloque Mécamat 2018*, Aussois, France, January 2018.
- L49. **J. Dirrenberger**. From architected materials to the development of large-scale additive manufacturing. **Invited lecture** *UPEM*, Marne-la-Vallée, France, December 2017.
- L48. **J. Dirrenberger**. Hybrid architected materials: an example of fruitful collaboration between France and Australia. *AFRAN Forum*, **Invited keynote lecture**, Canberra, Australia, December 2017.
- L47. **J. Dirrenberger**. The future of architected materials: Opportunities for innovation and international collaboration. *EDTAS Advanced Materials & Manufacturing*, **Invited keynote lecture**, Melbourne, Australia, November 2017.
- L46. **J. Dirrenberger**, Y. Qi, and A. Molotnikov. Preliminary results on the mechanical behavior of bio-inspired hybrid architected lattice structures. *Réseau National de Connaissances*, **Invited lecture**, Angers, France, June 2017.
- L45. **J. Dirrenberger**. XtreeE– the Large-Scale 3D-Printing company. *Ecole Nationale Supérieure d'Architecture de Paris-La Villette*, Paris, France, May 2017.
- L44. **J. Dirrenberger**, S. Forest, D. Jeulin. Towards gigantic RVE sizes for 3D stochastic fibrous networks. *Monash University, Department of Materials Science*, Melbourne, Australia, December 2016.
- L43. **J. Dirrenberger**. From architected materials to the development of large-scale additive manufacturing. **Invited lecture** *TU Delft*, Delft, The Netherlands, November 2016.
- L42. **J. Dirrenberger**. From architected materials to the development of large-scale additive manufacturing. **Invited lecture** *ENS Paris-Saclay*, Cachan, France, November 2016.

- L41. **J. Dirrenberger**, N. Auffray, M. Poncelet and G. Rosi. Approche holliste de la chiralité dans les métamatériaux architecturés. **Invited lecture** *Rencontres Franciliennes de Mécanique*, Dammarie-les-Lys, France, June 2016.
- L40. **J. Dirrenberger**. Fabrication additive et grande échelle: le projet DEMOCRITE. **Invited lecture** *ENPC Alumni, Maison des Ponts*, Paris, France, May 2016.
- L39. **J. Dirrenberger**. Architected materials: A short overview. **Invited lecture** *National University of Singapore*, Singapore, April 2016.
- L38. **J. Dirrenberger**. Modelling the behaviour of auxetic materials. *National University of Singapore*, Singapore, April 2016.
- L37. **J. Dirrenberger**. Modelling the plastic behaviour of auxetic materials. **Invited lecture** *Centre National d'Études Spatiales*, Paris, France, March 2016.
- L36. **J. Dirrenberger**. Matériaux, computation et architectures. **Invited lecture** *École Nationale Supérieure d'Architecture Paris-Malaquais*, Paris, France, February 2016.
- L35. **J. Dirrenberger**. Modelling the plastic behaviour of auxetic materials. **Invited lecture** *Unité de Mécanique, ENSTA-ParisTech*, Palaiseau, France, February 2016.
- L34. **J. Dirrenberger**. Towards gigantic RVE sizes for 3D stochastic fibrous networks. **Invited lecture** *Laboratoire de Mathématique Nicolas Oresme, Université de Caen Basse-Normandie*, Caen, France, December 2015.
- L33. A. Bironeau, **J. Dirrenberger**, C. Sollogoub, G. Miquelard-Garnier, S. Roland. Evaluation of morphologically representative sample sizes for nanolayered polymer blends. **Invited lecture** *Centre for Molecular and Macromolecular Studies, Polish Academy of Sciences*, Łódź, Poland, November 2015.
- L32. **J. Dirrenberger**. Matériaux pour la construction durable. **Invited lecture**, *Séminaire du DPEA Architecture post-carbone, Ecole d'Architecture de la Ville et des Territoires*, Marne-la-Vallée, France, October 2015.
- L31. **J. Dirrenberger**. Projet DEMOCRITE : Démonstrateur technologique pour une fabrication additive à grande échelle. **Invited lecture**, *Salon 3D Print*, Lyon, France, September 2015.
- L30. **J. Dirrenberger**. Possibilities offered by 3D printing for the development of architected and metamaterials. **Invited lecture**, *International Workshop on Metamaterials*, Marne-la-Vallée, France, April 2015.
- L29. **J. Dirrenberger**. Computation, robotique et impression 3D en ingénierie des matériaux. **Invited lecture**, *Ecole Supérieure des Beaux-Arts Tours Angers Le Mans*, Le Mans, France, April 2015.
- L28. **J. Dirrenberger**, S. Forest, D. Jeulin. Towards gigantic RVE sizes for 3D stochastic fibrous networks. *Séminaire du laboratoire MSME à l'Université Paris-Est*, Marne-la-Vallée, France, January 2015.
- L27. **J. Dirrenberger**, G. Miquelard-Garnier, C. Sollogoub, S. Roland, P. Peyre, T. Gu, O. Castelnau, A. Guinault, G. Regnier. From nano- to macroscale applications: multiple processing routes for architected materials. *Architected Biomaterials, Medical and Tissue Engineering Symposium*, Berlin, Germany, December 2014.
- L26. **J. Dirrenberger**. From Materials Engineering to the Computational Development of Architected Materials. **Invited lecture**, *Hyperbody Media Studies Lectures, TU Delft*, Delft, Netherlands, November 2014.
- L25. **J. Dirrenberger**. Matériaux pour la construction durable. **Invited lecture**, *Séminaire du DPEA Architecture post-carbone, Ecole d'Architecture de la Ville et des Territoires*, Marne-la-Vallée, France, November 2014.
- L24. **J. Dirrenberger**. Matériaux architecturés par fabrication additive. *Séminaire de l'institut Carnot ARTS, ENSAM*, Paris, France, May 2014.
- L23. **J. Dirrenberger**. L'impression 3D, un rendez-vous manqué ? **Invited lecture**, *Séminaire "Société de la connaissance et innovation", Master Affaires Publiques, SciencesPo*, Paris, France, April 2014.

- L22. **J. Dirrenberger**. Towards gigantic RVE sizes for 3D stochastic fibrous networks. *Séminaire du laboratoire PIMM à l'École Nationale Supérieure d'Arts et Métiers*, Paris, France, March 2014.
- L21. **J. Dirrenberger**. Introduction to architected materials. **Invited lecture**, *Composite Chair Workshop, AA[n+1]Lab*, Paris, France, March 2014.
- L20. **J. Dirrenberger**. Matériaux et construction durable. **Invited lecture**, *Séminaire du DPEA Architecture post-carbone, Ecole d'Architecture de la Ville et des Territoires*, Marne-la-Vallée, France, November 2013.
- L19. **J. Dirrenberger**. Towards gigantic RVE sizes for 3D stochastic fibrous networks. *Journées "Problématiques multi-échelles dans les milieux fibreux" du GDR 3MF-Mécanique Multi-échelles des Milieux Fibreux*, Grenoble, France, June 2013.
- L18. **J. Dirrenberger**. Towards gigantic RVE sizes for 3D stochastic fibrous networks. **Invited lecture**, *Institut Jean Le Rond d'Alembert, Université Pierre et Marie Curie*, Paris, France, May 2013.
- L17. **J. Dirrenberger**. Introduction to architected materials. **Invited lecture**, *RFR Group*, Paris, France, March 2013.
- L16. **J. Dirrenberger**, S. Forest and D. Jeulin. Effective thermal properties of 3D stochastic fibrous networks. *Workshop on Architected Materials at Collège de France*, Paris, France, February 2013.
- L15. **J. Dirrenberger**. Introduction to architected materials. **Invited lecture**, *The Bartlett School of Architecture, University College London*, London, UK, February 2013.
- L14. **J. Dirrenberger**, S. Forest and D. Jeulin. RVE size determination for 3D stochastic fibrous networks. *Colloquium at Université Paris-Est*, Marne-la-Vallée, France, January 2013.
- L13. **J. Dirrenberger**, S. Forest and D. Jeulin. Effective Properties of Architected Materials: Periodic Auxetics and Stochastic Networks of Infinite Fibres. *Seminar at Centre des Matériaux, MINES-ParisTech*, Evry, France, June 2012.
- L12. **J. Dirrenberger**, S. Forest and D. Jeulin. Homogenization methods for architected materials. *Roundtable on architected materials, MINES-ParisTech*, Paris, France, May 2012.
- L11. **J. Dirrenberger**. Introduction to architected materials. *Roundtable on architected materials, MINES-ParisTech*, Paris, France, May 2012.
- L10. **J. Dirrenberger**, S. Forest, D. Jeulin, M. Faessel and F. Willot. Etude de la taille du VER pour l'homogénéisation de milieux fibreux poissoniens. *Séminaire du département Mécanique et Matériaux, MINES-ParisTech*, Paris, France, Feb. 2012.
- L9. **J. Dirrenberger**, S. Forest, D. Jeulin, M. Faessel and F. Willot. Effective properties of architected materials. *Séminaire du groupe Comportement et Calcul de Structures, Centre des Matériaux, MINES-ParisTech*, Evry, France, Nov. 2011.
- L8. **J. Dirrenberger**, S. Forest, D. Jeulin, C. Colin, J.-D. Bartout, M. Faessel and F. Willot. Effective properties of architected materials. *ArchiMat 2011, 1st International School on Architected Materials*, Autrans, France, May 2011.
- L7. **J. Dirrenberger**, S. Forest, D. Jeulin, M. Faessel and F. Willot. Modélisation de milieux fibreux aléatoires enchevêtrés et estimation de VER. *Journées thématiques MECAMAT*, Sophia-Antipolis, France, May 2011.
- L6. **J. Dirrenberger**, S. Forest, D. Jeulin, C. Colin, J.-D. Bartout and M. Faessel. Propriétés effectives des matériaux architecturés. *Colloque Mecamat 2011*, Aussois, France, Jan. 2011.
- L5. **J. Dirrenberger** and S. Forest. Homogénéisation numérique de microstructures périodiques avec Zébulon/Z-Set. *Club Zébulon*, Evry, France, Dec. 2010.
- L4. **J. Dirrenberger**, S. Forest and D. Jeulin. Propriétés effectives des matériaux architecturés : cas périodique et cas aléatoire. *École thématique CE2M10 "Changement d'échelles en mécanique des matériaux"*, Briançon, France, Aug. 2010.
- L3. **J. Dirrenberger**, S. Forest, D. Jeulin and C. Colin. Propriétés mécaniques effectives des matériaux architecturés par simulation numérique massive et prototypage rapide. *Journées annuelles de la SF2M*, Paris, France, June 2010.

- L2. **J. Dirrenberger**, S. Forest, F. N’Guyen and D. Jeulin. Modélisation de microstructures aléatoires et notion de volume élémentaire représentatif. *Colloque Mécamat 2010*, Aussois, France, Jan. 2010.
- L1. **J. Dirrenberger**, K. Scrivener, S. Bishnoi and A. Guidoum. Effects of Particle Size Distribution on Mechanical Properties of Cement Paste at Early Age. *Junior EUROMAT 2008*, Lausanne, Switzerland, July 2008.

G Doctoral courses (2)

- D2. **J. Dirrenberger**. Introduction to computational homogenization for fibrous media. *Models of Generalized Continua characterized by Quasi-Inextensible Fibrous Structures*, **Invited lecture**, Arpino, Italy, Septembre 2016.
- D1. **J. Dirrenberger**, S. Forest, D. Jeulin. Towards gigantic RVE sizes for 3D stochastic fibrous networks. *Models of Generalized Continua characterized by Quasi-Inextensible Fibrous Structures*, **Invited lecture**, Arpino, Italy, Septembre 2016.

H Technical reports (6)

- T6. **J. Dirrenberger**. Towards an integrated approach for the development of architected materials. Habilitation thesis, *Sorbonne Université*, Paris, France, 2018. <https://hal.sorbonne-universite.fr/tel-02047005v1>
- T5. **J. Dirrenberger**. Architected material concepts for launcher-satellite damping connection. *CNES*, Paris, France, 2017.
- T4. **J. Dirrenberger**. Effective properties of architected materials. PhD thesis, *MINES-ParisTech*, Paris, France, 2012. <http://pastel.archives-ouvertes.fr/pastel-00797363/fr/>
- T3. **J. Dirrenberger** and S. Forest. Simulation et homogénéisation de microstructures périodiques. *Centre des Matériaux, MINES-ParisTech*, Evry, France, 2010.
- T2. **J. Dirrenberger**. Durable Oil-Well Cement for Safe and Reliable CO₂ Storage. MSc thesis, *Université Paris-Sud XI*, Orsay, France, 2009.
- T1. **J. Dirrenberger** and I. Khalfallah. Physico-chemical investigation of the carbonation reaction in oil-well cements for CO₂ storage application. Technical report, *Schlumberger Ltd.*, Clamart, France, 2009.