

**Personal data:**

Name Christian F. Niordson  
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Date of birth April 3, 1975

**Education:**

1994 High school, Holte Gymnasium  
1999 M.Sc.Eng., Solid Mechanics, Technical University of Denmark  
2003 Ph.D., Solid Mechanics, Department of Mechanical Engineering, Technical University of Denmark

**Employment:**

2002-2005 Assistant professor, Dept. Mech. Eng., Technical University of Denmark  
2005-2016 Associate professor, Dept. Mech. Eng., Technical University of Denmark  
2014- Head of Section for Solid Mechanics, Dept. Mech. Eng., Technical University of Denmark  
2016- Professor, Dept. Mech. Eng., Technical University of Denmark

**Grants and Prizes:**

2003 P. Gorm-Petersen's Memorial Prize for best Ph.D. thesis.  
2003 Co-applicant of the research project "Modeling Plasticity at the Micron Scale", sponsored by the Danish Technical Research Council.  
2008 Principle investigator for the research project "Plasticity Across the Scales", sponsored by the Danish Research Council for Technology and Production Sciences.  
2011 Sapere Aude Research Leader Grant for the 4-year (2012-2015) research project "Higher Order Theories in Solid Mechanics", sponsored by the Danish Council for Independent Research.  
2014 STATOIL-prize.

**Memberships and other academic activities:**

2006 Co-organizer of the IUTAM Symposium "Plasticity at the Micron Scale", Technical University of Denmark.  
2008 - 15 Scientific Advisory Board for 'International Journal of Plasticity'.  
2010 - Danish National Committee of International Union of Theoretical and Applied Mechanics (IUTAM).  
2011 - 14 Chairman of DCAMM - 'Danish Center for Applied Mathematics and Mechanics'.  
2011 - Board of Editors for 'International Journal of Solids and Structures'.  
2012 - General Assembly of IUTAM (International Union of Theoretical and Applied Mechanics).  
2012 - 14 Research Board of Department of Mechanical Engineering, DTU.  
2012 Chairman for the pre-nominated session on "Plasticity, Viscoplasticity and Creep", at the International Conference on Theoretical and Applied Mechanics 2012 in Beijing.  
2013 - Advisory board for the Belgian research project "Interface dominated mechanics of materials" sponsored by the Belgian Science Agency, Belspo.  
2013 - Scientific Committee of COMPLAS - Symposium on Computational Plasticity.  
2013 - Editorial Board of 'Journal of the Mechanical Behavior of Materials'.  
2013 Scientific Committee and local organizer of "Viggo Tvergaard Symposium: New Horizons in Materials Mechanics", June 5-7 2013.  
2014 - International Evaluation Committee of "EPFL Fellows".  
2014 - The Danish Academy of Technical Sciences.  
2015 Organizer of the symposium, 'Small Scale Plasticity', at the 2015 Society of Engineering Sciences (SES) meeting at Texas A&M University, College Station, Texas.  
2016 Organizer of the minisymposium 'Small Scale Plasticity and Microstructural Evolution' at the 22nd International Symposium on Plasticity, January 3 - 9, 2016, in Kona, Hawaii.  
2016 Chairman for the Thematic Session entitled 'Scalescale Effects in Materials', at the International Conference on Theoretical and Applied Mechanics in Montreal, August 2016.  
2016 - European Solid Mechanics Conference Committee (ESMCC).  
2016 - Associate Editor for Journal of the Mechanics and Physics of Solids.  

- Invited lectures at more than 15 times international conferences and symposia.
- Chairman and member of Ph.D. evaluation committees at KTH (Stockholm, Sweden), Columbia University, TU Eindhoven, Université Libre de Bruxelles, Norwegian University of Science and Technology, Aarhus University, Aalborg University and Technical University of Denmark.
- Invited seminars at University of Cambridge, TU Eindhoven, Brescia University, Columbia University and KTH.
- Reviewer for more than 10 international journals.

**Extended research visits at other universities:**

2001 5 months at Harvard University in collaboration with Professor John W. Hutchinson  
2010 5 months at Columbia University in collaboration with Professor Jeffrey W. Kysar  
2012 6 weeks at Columbia University in collaboration with Professor Jeffrey W. Kysar

#### Publications with peer review in ISI-journals (WoS h-index: 14):

1. Niordson, F. I. and Niordson, C. F., "On the accuracy of the asymptotic theory for circular cylindrical shells", *Archive of Applied Mechanics*, 1999, vol. 69, no. 9-10, pp 677-689.
2. Niordson, C. F. and Tvergaard, V., "Nonlocal Plasticity effects on the tensile properties of a metal matrix composite", *European Journal of Mechanics A/Solids*, 2001, vol. 20, no. 4, pp 601-613.
3. Niordson, C. F., "Analysis of steady-state ductile crack growth along a laser weld", *International Journal of Fracture*, 2001, vol. 111, no. 1, pp 53-69.
4. Niordson, C. F. and Tvergaard, V., "Nonlocal plasticity effects on fibre debonding in a whisker-reinforced metal", *European Journal of Mechanics A/Solids*, 2002, vol. 21, no. 2, pp 239-248.
5. Niordson, C. F. and Hutchinson, J. W., "Non-uniform plastic deformation of micron scale objects", *International Journal for Numerical Methods in Engineering*, 2003, vol. 56, pp 961-975.
6. Niordson, C. F., "Strain gradient plasticity effects in whisker-reinforced metals", *Journal of the Mechanics and Physics of Solids*, 2003, vol. 51, issue 10, pp 1863-1883.
7. Niordson, C. F. and Hutchinson, J. W., "On lower order strain gradient plasticity theories", *European Journal of Mechanics A/Solids*, 2003, vol. 22, no. 6, pp 771-778.
8. Tvergaard, V. and Niordson, C. F., "Nonlocal plasticity effects on interaction of different size voids", *International Journal of Plasticity*, 2004, vol. 20, pp 107-120.
9. Niordson, C. F. and Redanz, P., "Size-effects in plane strain sheet-necking", *Journal of the Mechanics and Physics of Solids*, 2004, vol. 52, pp 2431-2454.
10. Niordson, C. F. and Tvergaard, V., "Instabilities in power law gradient hardening materials", *International Journal of Solids and Structures*, 2005, vol. 42, pp 2559-2573.
11. Niordson, C. F. and Tvergaard, V., "Size-effects on cavitation instabilities", *Journal of Applied Mechanics*, 2006, vol. 73/2, pp 246-253.
12. Borg, U., Niordson, C. F., Fleck, N. A. and Tvergaard, V., "A viscoplastic strain gradient analysis of materials with voids or inclusions", *International Journal of Solids and Structures*, 2006, vol. 43, pp 4906-4916.
13. Niordson, C. F. and Tvergaard, V. "Size-effects in porous metals", *Modelling and Simulation in Materials Science and Engineering*, 2007, vol. 15, S51-S60.
14. Borg, U., Niordson, C. F. and Kysar, J.W., "Size effects on void growth in single crystals with distributed voids", *International Journal of Plasticity*, 2008, vol. 24, pp 688-701.
15. Hussein, M.I., Borg, U., Niordson, C.F. and Deshpande, V.S., "Plasticity size effects in voided crystals", *Journal of the Mechanics and Physics of Solids*, 2008, vol. 56, issue 1, pp 114-131.
16. Niordson, C. F., "On higher order boundary conditions at elastic-plastic boundaries in strain gradient plasticity", *Philosophical Magazine*, 2008, vol. 88, no. 30-32, pp 3731-3746.
17. Tvergaards, V. and Niordson, C. F., "Size-effects at a crack-tip interacting with a number of voids", *Philosophical Magazine*, 2008, vol. 88, no. 30-32, pp 3827-3840.
18. Niordson, C. F., "Void growth to coalescence in a non-local material", *European Journal of Mechanics A/Solids*, 2008, vol. 27, no. 2, pp 222-233.
19. Legartha, B. N. and Niordson, C. F., "Debonding failure and size effects in micro reinforced composites", *International Journal of Plasticity*, 2010, vol. 26, pp 149-165.
20. Niordson, C. F. and Legartha, B. N., "Strain gradient effects on cyclic plasticity", *Journal of the Mechanics and Physics of Solids*, 2010, vol. 58, pp 542-557.
21. Niordson, C. F. and Hutchinson, J. W., "Basic strain gradient plasticity theories with application to constrained film deformation", *Journal of Mechanics of Materials and Structures*, 2011, vol. 6, issue 1, pp 395-416.
22. Azizi, R., Niordson, C. F. and Legartha, B. N., "Size-effects on yield surfaces for micro reinforced composites", *International Journal of Plasticity*, 2011, vol. 27, Issue 11, pp. 1817-1832.
23. Nielsen K. L. and Niordson, C. F., "Rate sensitivity of mixed mode interface toughness of dissimilar metallic materials: Studied at steady state", *International Journal of Solids and Structures*, 2012, vol. 49, issue 4-4, pp 576-583.
24. Nielsen, C. V., Legartha, B. N. and Niordson, C. F., "Extended FEM modeling of crack paths near inclusions", *International Journal for Numerical Methods in Engineering*, 29 sep 2011, DOI: 10.1002/nme.3268.
25. Nielsen K. L., Niordson, C. F. and Hutchinson, J. W., "Strain gradient effects on steady state crack growth in rate-sensitive materials", *Engineering Fracture Mechanics*, 2012, 96, pp 61-71.
26. Oztop, M.S., Niordson, C.F. and Kysar, J.W., "Length-scale effect due to periodic variation of geometrically Necessary Dislocation Densities", *International Journal of Plasticity*, 2013, vol. 41, pp. 189-201.
27. Tvergaard, V. Niordson, C.F. and Hutchinson, J.W., "Material size effects on crack growth along patterned Wafer-Level Cu-Cu bonds", *International Journal of Mechanical Sciences*, 2013, vol. 68, pp. 270-276.
28. Dahlberg, C.F.O., Faleskog J., Niordson, C.F. and Legartha, B.N., "A deformation mechanism map for polycrystals modeled using strain gradient plasticity and interfaces that slide and separate", *International Journal of Plasticity*, 2013, vol. 43, pp. 177-195.

29. Azizi, R., Legarth, B.N. and Niordson, C.F., "A new macroscopically anisotropic pressure dependent yield function for metal matrix composite based on strain gradient plasticity for the microstructure", *Journal of the Mechanics and Physics of Solids*, 2013, vol. 61, pp 991-1009.
30. Nielsen K. L. and Niordson, C. F., "A 2D finite element implementation of the Fleck-Willis strain-gradient flow theory", *European Journal of Mechanics/A Solids*, 2013, vol. 41, pp. 134-142.
31. Vajari, D. A., Legarth, B. N. and Niordson, C. F., "Micromechanical modeling of unidirectional composites with uneven interfacial strengths", *European Journal of Mechanics/A Solids*, 2013, vol. 42, pp 241-250.
32. Niordson, C. F. and Kysar, J. W., "Computational strain gradient crystal plasticity", *Journal of the Mechanics and Physics of Solids*, 2014, vol. 62, pp 31-47.
33. Nielsen, K. L. and Niordson, C. F., "A numerical basis for strain-gradient plasticity theory: Rate-independent and rate-dependent formulations", *Journal of the Mechanics and Physics of Solids*, 2014, vol. 63, pp 113-127.
34. Azizi, R., Niordson, C.F. and Legarth, B.N., "On homogenization of metal matrix composites using strain gradient plasticity rate-dependent formulations", *Acta Mechanica Sinica*, 2014, vol. 30, pp. 175-190.
35. Nielsen, K.L., Niordson, C.F. and Hutchinson, J.W., "Strain Gradient Effects in Periodic Flat Punch Indenting at Small Scales", *International Journal for Solids and Structures*, 2014, vol. 51, pp 3549-3556.
36. El-Naaman, S.A., Nielsen, K.L. and Niordson C.F., "On modeling micro-structural evolution using a higher order strain gradient continuum theory", *International Journal of Plasticity*, 2016, vol. 76, pp 285-298.
37. Nielsen, K.L., Niordson, C.F. and Hutchinson, J.W., "Rolling at small scales", *Journal of Manufacturing Science and Engineering - Transactions of the ASME*, 2016, vol. 138, pp XX-XX.
38. Martinez-Pañeda, E. and Niordson, C.F., "On fracture in finite strain gradient plasticity", Accepted for publication in *International Journal of Plasticity*.
39. Polious K. and Niordson, C.F., "Homogenization of long fiber reinforced composites including fiber bending effects", Accepted for publication in *Journal of the Mechanics and Physics of Solids*.

#### Other publications:

- 1999 Niordson, C. F., Master thesis: "Elastic-plastic analysis of steady-state crack growth"(in Danish), August 1999.
- 2002 Niordson, C. F., Ph.D. thesis: "Non-local modeling of materials", DCAMM Report No. S 88, September 2002.
- 2002 Niordson, C. F., "Nonlocal plasticity effects on fracture toughness", In: Khan, A.S. and Lopez-Pamies, O. (eds.) Proceedings of Plasticity '02: Plasticity, Damage and Fracture at Macro, Micro and Nano Scales, Aruba, January 3-9, Fulton, Maryland, USA, Neat Press, pp 591-593.
- 2003 Niordson, C. F., "On the effect of strain gradients in a fiber reinforced metal", In: Pedersen, P. and Olhoff, N. (eds.), The Frithiof Niordson Volume Proceedings from DCAMM International Symposium on, Challenges in Applied Mechanics Frederiksdal, July 25-27, 2002, Kgs. Lyngby, Denmark, DCAMM, pp 137-148.
- 2004 Niordson, C. F., "Size-Effects in Void Growth", In: W. Gutkowski, T. A. Kowalewski (eds.), Proceedings of 'ICTAM 2004 Mechanics of the 21st Century', Warsaw, Poland, August 15-21, 2004, CD-ROM, Springer, Netherlands.
- 2006 Niordson, C. F., "Void growth on the micron scale", In: Khan, A.S. and Kazmi, R. (eds.) Proceedings of 'The 12th International Symposium on Plasticity & Its Current Applications' Halifax, Canada, July 17-22, 2006, pp 661-663, Neat Press, USA, CD-ROM.
- 2008 Niordson, C. F., "Strain gradient effects on void growth and coalescence", In: Khan, A.S. and Farrock, B. (eds.), Proceedings of 'The 14th International Symposium on Plasticity & Its Current Applications' Kona, Hawaii, USA, January 3-8, 2008, pp 427-429, Neat Press, USA, CD-ROM, ISBN: 0-9659463-8-X.
- 2008 Niordson, C. F. Niordson and Tvergaard, V., "The effect of void shape on size-dependent void growth", Accepted for publication in Proceedings of 'ICTAM 2008, Mechanics of the 21st Century' Adelaide, Australia, August 24-29, 2008, CD-ROM, Springer, Netherlands.
- 2009 Niordson, C. F., "On the effects of strain gradient plasticity during cyclic loading", In: Khan, A.S. and Farrock, B. (eds.), Proceedings of 'The 15th International Symposium on Plasticity & Its Current Applications' St. Thomas, U.S. Virgin Islands, January 3-8, 2009, Neat Press, USA, CD-ROM, ISBN: 0-9659463-9-8.
- 2009 Legarth, B. N. and Niordson, C. F., "Strain gradient effects in composites", In: Khan, A.S. and Farrock, B. (eds.), Proceedings of 'The 15th International Symposium on Plasticity & Its Current Applications' St. Thomas, U.S. Virgin Islands, January 3-8, 2009, Neat Press, USA, CD-ROM, ISBN: 0-9659463-9-8.
- 2010 Niordson, C. F. and Kysar, J. W., "Continuum modeling of size-effects in single crystals", In: Eriksson, A. and Tibert, G. (eds.), 'Proceedings of NSCM-23: the 23rd Nordic Seminar on Computational Mechanics', pp. 126-129, Royal Institute of Technology (KTH), Stockholm, Sweden, October 21-22, 2010, Trista-Mek, ISSN: 0348-467X.
- 2011 Niordson, C. F. and Kysar, J. W., "Computational strain gradient plasticity", In: Khan, A.S., Meredith, C. and Farrokh, B. (eds.), Proceedings of 'The 17th International Symposium on Plasticity & Its Current Applications' Puerto Vallarta, Mexico, January 3-8, 2011, Neat Press, USA, CD-ROM, ISBN: 0-9659463-1-2.

- 2012 Niordson, C. F. and Kysar, J. W., "On size-effects in single crystal wedge indentation", In: Khan, A.S. and Farrock, B. (eds.) Proceedings of 'The 18th International Symposium on Plasticity & Its Current Applications', San Juan, Puerto Rico, January 3-8, 2012, Neat Press, USA, CD-ROM.
- 2012 Niordson, C. F., "Modeling size-effects in single crystals at finite strains: Indentation of FCC crystals", Proceedings of ICTAM 2012, Beijing, China, August 20-24, 2012, CD-ROM.
- 2013 Niordson, C. F. and Kysar, J. W., "On modeling of geometrically necessary dislocation densities in plastically deformed single crystals", In: Khan, A.S. (ed.), Proceedings of 'The 19th International Symposium on Plasticity & Its Current Applications', Nassau, Bahamas, January 3-8, 2013, Neat Press, USA, CD-ROM.
- 2013 Nielsen, K.L. and Niordson, C. F. "A numerical basis for rate-independent strain gradient plasticity theory", In: Khan, A.S. (ed.), Proceedings of 'The 19th International Symposium on Plasticity & Its Current Applications', Nassau, Bahamas, January 3-8, 2013, Neat Press, USA, CD-ROM.
- 2015 El-Naaman, S.A., Nielsen, K.L. and Niordson, C. F. "Strain gradient crystal plasticity: A continuum mechanics approach to modeling micro-structural evolution", In: Khan, A.S. (ed.), Proceedings of 'The 21st International Symposium on Plasticity & Its Current Applications', Montego Bay, Jamaica, January 4-9, 2015, Neat Press, USA, CD-ROM.