Curriculum Vitae

Christian Karnutsch

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Research Activities and Employment

Since Oct. 2007	**Lecturer** University of Sydney, CUDOS and School of Physics, Sydney, Australia
Oct. 2003 – Aug. 2007	**Research Associate** Light Technology Institute, Universität Karlsruhe (TH), Karlsruhe, Germany *Investigated organic semiconductor lasers and OLEDs*
Nov. 1998 - Sept. 2002	**R&D Engineer** OSRAM Opto Semiconductors, Regensburg, Germany, Research & Development Department *Design, simulation and MOCVD growth of AlGaInP-based optoelectronic devices (LEDs, Lasers, VCSELs, VECSELs,…)*
March 1996 - Sept. 1996 Internship abroad	**A-LASER Inc.**, Beaverton, Oregon, USA *High precision laser cutting of SMT solder paste stencils using a high power Nd:YAG laser system (LPKF Stencil Laser)*
Aug. 1994 - Feb. 1995 Internship abroad	**FMV Lamel**, Villieu, France *Development and manufacturing of electric motors and fans*

Education

July 2007	**Dr.-Ing. (Distinction) in Electrical Engineering** Universität Karlsruhe (TH), Karlsruhe, Germany
September 2003	**MSc (Distinction) in Photonics and Optoelectronic Devices** University of St. Andrews, Scotland, UK and Heriot-Watt University Edinburgh, Scotland, UK
June 2003 – Aug. 2003	Master's research project at the Universität Karlsruhe (TH), Germany Thesis title 'Organic Semiconductor Lasers'
Sept. 2002 – Sept. 2003	Study of Photonics and Optoelectronic Devices University of St. Andrews, Scotland, UK and Heriot-Watt University Edinburgh, Scotland, UK
September 1998	**Diploma Engineer in Physical Engineering (Diplom-Ingenieur (FH))** University of Applied Sciences, Heilbronn, Germany

March 1998 - Sept. 1998	Diploma thesis work at VISHAY-TEMIC Semiconductors, Heilbronn, Germany, investigating the 'Optimization of the MOCVD-Process of AlGaInP Light-Emitting Diodes'
1993 - 1998	Study of Physical Engineering University of Applied Sciences, Heilbronn, Germany

Reviewer for Journals

Journal of Materials Science

Electronics Letters

Optics Communications

List of Publications

Books

1. C Karnutsch, *Organic semiconductor lasers*, Cuvillier Verlag, Göttingen (2007), ISBN-13: 9783867273060

Refereed journal articles

2. C Karnutsch, C Pflumm, G Heliotis, JC deMello, DDC Bradley, J Wang, T Weimann, V Haug, C Gärtner, U Lemmer, 'Improved organic semiconductor lasers based on a mixed-order distributed feedback resonator design', *Applied Physics Letters* **90**, 131104, 2007
3. C Karnutsch, M Stroisch, M Punke, U Lemmer, J Wang, T Weimann, Laser diode pumped organic semiconductor lasers utilizing two-dimensional photonic crystal resonators, *IEEE Photonics Technology Letters*, **19** (10), 741–43, 2007
4. C Gärtner, C Karnutsch, C Pflumm, U Lemmer, 'Numerical device simulation of double-heterostructure organic laser diodes including current induced absorption processes', *IEEE Journal of Quantum Electronics*, **43** (11), 1006–17, 2007
5. C Gärtner, C Karnutsch, C Pflumm, U Lemmer, 'The influence of annihilation processes on the threshold current density of organic laser diodes', *Journal of Applied Physics* **101**, 023107, 2007
6. C Karnutsch, C Gärtner, V Haug, U Lemmer, T Farrell, BS Nehls, U Scherf, J Wang, T Weimann, G Heliotis, C Pflumm, JC deMello, DDC Bradley, 'Low threshold blue conjugated polymer lasers with first- and second-order distributed feedback', *Applied Physics Letters*, **89**, 201108, 2006
7. M Punke, F Hoos, C Karnutsch, U Lemmer, N Linder, K Streubel, 'High-repetition-rate white-light pump-probe spectroscopy with a tapered fiber', *Optics Letters*, **31** (8), 1157–59, 2006
8. M Reufer, J Feldmann, C Karnutsch, M Gerken, U Lemmer, P Rudati, A Ruhl, D Müller, K Meerholz, 'Amplified spontaneous emission in an organic semiconductor multilayer waveguide structure including a highly conductive transparent electrode', *Applied Physics Letters*, **86**, 221102, 2005
9. C Pflumm, C Karnutsch, M Gerken, U Lemmer, 'Parametric study of modal gain and threshold power density in electrically pumped single-layer organic optical amplifier and laser diode structures', *IEEE Journal of Quantum Electronics*, **41** (3), 316–36, 2005

10. S-S Schad, B Neubert, C Eichler, M Scherer, F Habel, M Seyboth, F Scholz, D Hofstetter, P Unger, W Schmid, C Karnutsch, K Streubel, 'Absorption and light scattering in InGaN-on-sapphire- and AlGaInP-based light-emitting diodes', *IEEE Journal of Lightwave Technology*, **22** (10), 2323–32, 2004

11. T Gessmann, EF Schubert, JW Graff, C Karnutsch, K Streubel, 'Omni-directionally reflective contacts for light-emitting diodes', *IEEE Electron Device Letters*, **24** (10), 683–85, 2003

12. W Schmid, M Scherer, C Karnutsch, B Neubert, S-S Schad, W Wegleiter, A Plößl, K Streubel, 'High Efficiency, red and infrared light-emitting diodes using radial outcoupling taper', *IEEE Journal on Selected Topics in Quantum Electronics*, **8** (2), 256-63, 2002

13. R Wirth, C Karnutsch, S Kugler, K Streubel, 'High Efficiency Resonant Cavity LEDs emitting at 650 nm', *IEEE Photonics Technology Letters*, **13** (5), 421-23, 2001

Papers in refereed conference proceedings

12. M Punke, T Woggon, M Stroisch, B Ebenhoch, U Geyer, C Karnutsch, M Gerken, U Lemmer, M Bruendel, J Wang, T Weimann, 'Organic semiconductor lasers as integrated light sources for optical sensor systems', *Proceedings of the SPIE: Organic-based Chemical and Biological Sensors*, Vol 6659, 665909, 2007

13. M Punke, T Woggon, M Stroisch, MP Heinrich, C Karnutsch, S Mozer, U Lemmer, M Bruendel, DG Rabus, T Weimann, 'All-organic waveguide coupled solid-state distributed feedback laser', *European Conference on Lasers and Electro-Optics (CLEO) and the International Quantum Electronics Conference (IQEC)*, Munich, Germany, 2007, ISBN: 1-4244-0931-4

14. C Gärtner, C Karnutsch, U Lemmer ,'Numerical study of annihilation processes, excited state absorption and field quenching for various organic laser diode design concepts', *European Conference on Molecular Electronics (ECME)*, Metz, France, 2007

15. C Gärtner, C Karnutsch, J Brückner, N Christ, S Uebe, U Lemmer, P Görrn, T Rabe, T Riedl, W Kowalsky, 'Loss processes in organic double-heterostructure laser diodes', Proceedings *of the SPIE: Organic Light Emitting Materials and Devices X*I, Vol 6655, 6550T-13, 2007

16. C Gärtner, C Karnutsch, U Lemmer, 'Rate coefficients of bimolecular singlet exciton annihilation in organic semiconductor materials', *7th International Conference on Optical Probes of π-Conjugated Polymers and Functional Self Assemblies (OP)*, Turku, Finland, 2007

17. C Gärtner, C Karnutsch, U Lemmer, 'Reducing the impact of charge carrier induced absorption in organic double -heterostructure laser diodes', *European Conference on Lasers and Electro-Optics (CLEO) and the International Quantum Electronics Conference (IQEC)*, Munich, Germany, 2007, ISBN: 1-4244-0931-4

18. C Pflumm, C Gärtner, C Karnutsch, U Lemmer, 'Influence of electronic properties on the threshold behavior of organic laser diode structures', *Proceedings of the SPIE: Organic Light-Emitting Materials and Devices X*, Vol 6333, 63330W, 2006

19. C Gärtner, C Pflumm, C Karnutsch, V Haug, U Lemmer, 'Numerical study of annihilation processes in electrically pumped organic semiconductor laser diodes', *Proceedings of the SPIE: Organic Light-Emitting Materials and Devices X*, Vol 6333, 63331J, 2006

20. C Karnutsch, V Haug, C Gärtner, U Lemmer, T Farrell, BS Nehls, U Scherf, J Wang, T Weimann, G Heliotis, C Pflumm, JC deMello, DDC Bradley, 'Low threshold blue conjugated polymer DFB lasers', *Conference on Lasers and Electro-Optics (CLEO)*, CFJ3, Long Beach, US, 2006

21. W Kowalsky, T Rabe, D Schneider, H-H Johannes, C Karnutsch, M Gerken, U Lemmer, J Wang, T Weimann, P Hinze, T Riedl, 'Organic semiconductor distributed feedback lasers', *Proceedings of the SPIE: Nanosensing: Materials and Devices II*, Vol 6608, 194-208, 2005

22. C Pflumm, C Karnutsch, R Boschert, M Gerken, U Lemmer, JC de Mello, DDC Bradley, 'Modelling of the laser dynamics of electrically pumped organic semiconductor laser diodes', *Proceedings of the SPIE: Organic Light-Emitting Materials and Devices IX*, Vol 5937, 79-91, 2005

23. C Pflumm, C Karnutsch, M Gerken, U Lemmer, 'Numerical simulation of modal gain in electrically pumped organic semiconductor lasers', *Proceedings of the SPIE: Organic Light-Emitting Materials and Devices VIII*, Vol 5519, 279-86, 2004

24. C Pflumm, C Karnutsch, M Gerken, U Lemmer, 'Gain and Polaron Absorption in Electrically Pumped Single-Layer Organic Laser Diodes', *Proceedings of the 34th European Solid-State Device Research Conference (ESSDERC)*, Leuven, Belgium, 421 – 24, 2004

25. N Linder, R Butendeich, W Schmid, S Tautz, K Streubel, C Karnutsch, S Rurländer, H Schweizer, F Scholz, '900 mW continuous wave operation of AlInGaP tapered lasers and superluminescent diodes at 640 nm', *Conference on Lasers and Electro-Optics (CLEO)*, CMJ1, San Francisco, US, 2004

26. S Tautz, W Schmid, J Maric, R Butendeich, K Streubel, N Linder, C Karnutsch, 'High power AlInGaP broad area lasers and laser bars in the visible range from 635 nm to 670 nm', Conference on Lasers and Electro-Optics (CLEO), CTuP20, San Francisco, US, 2004

27. R Wirth, C Karnutsch, S Illek, I Pietzonka, A Plößl, P Stauss, W Stein, W Wegleiter, H Zull, R Windisch, K Streubel, 'Recent progress of AlGaInP thin-film light-emitting diodes', *Proceedings of the SPIE: Organic Light-Emitting Materials and Devices VII*, Vol 4996, 1-9, 2003

28. S-S Schad, B Neubert, C Karnutsch, W Schmid, M Seyboth, P Unger, 'Absorption of guided modes in light-emitting diodes', *Proceedings of the SPIE: Organic Light-Emitting Materials and Devices VII*, Vol 4996, 10-17, 2003

29. C Rooman, S De Jonge, C Karnutsch, K Streubel, M Kuijk, B Dutta, G Borghs, P Heremans, 'Wafer-bonded thin-film surface-roughened light emitting diodes', *Proceedings of the SPIE: Organic Light-Emitting Materials and Devices VII*, Vol 4996, 40-45, 2003

30. R Joray, J Dorsaz, RP Stanley, M Ilegems, M Rattier, C Karnutsch, K Streubel, 'High Extraction Efficiency AlGaInP Microcavity Light Emitting Diodes at 650 nm with AlGaAs-AlOx DBR', *29th International Symposium on Compound Semiconductors (ISCS)*, Lausanne, Switzerland, 2002

31. M Müller, N Linder, C Karnutsch, J Luft, W Schmid, K Streubel, S-S Beyertt, U Brauch, A Giesen, G Döhler, 'Optically Pumped Vertical External Cavity Semiconductor Thin-Disk Laser with CW Operation at 660 nm', *29th International Symposium on Compound Semiconductors (ISCS)*, Lausanne, Switzerland, 2002

32. N Linder, C Karnutsch, J Luft, M Müller, W Schmid, K Streubel, S-S Beyertt, A Giesen, G Döhler, 'High Power 660 nm Optically Pumped Semiconductor Thin-Disk Lasers', *IEEE LEOS Summer Topicals*, MF2 5-6, Quebec, Canada, 2002

33. M Scherer, B Neubert, S-S Schad, W Schmid, C Karnutsch, W Wegleiter, A Plößl, K Streubel, 'Efficient InAlGaP Light-Emitting Diodes using Radial Outcoupling Taper', *Proceedings of the SPIE: Light-Emitting Diodes: Research, Manufacturing, and Applications VI*, Vol 4641, 31-41, 2002

34. R Windisch, C Rooman, S De Jonge, C Karnutsch, M Kuijk, B Dutta, G Borghs, K Streubel, P Heremans, 'Thin-film surface textured LEDs with current injection through a rear reflector', *Proceedings of the SPIE: Light-Emitting Diodes: Research, Manufacturing, and Applications VI*, Vol 4641, 13-18, 2002

35. M Müller, N Linder, C Karnutsch, W Schmid, K Streubel, J Luft, S-S Beyertt, A Giesen, G Döhler, 'Optically Pumped Semiconductor Thin-Disk-Laser with External-Cavity Operating at 650 nm', *Proceedings of the SPIE: Vertical-Cavity Surface-Emitting Lasers VI*, Vol 4649, 265-71, 2002

36. R Wirth, C Karnutsch, S Kugler, W Plass, W Huber, E Baur, K Streubel, 'Resonant-Cavity LEDs for plastic optical fiber communication', *10th International Plastic Optical Fibres Conference*, Amsterdam, 2001

37. N Schunk, K Panzer, E Baur, W Kuhlmann, K Streubel, R Wirth, C Karnutsch, 'IEEE1394b POF transmission system 500Mbit/s versus 50m 0.3NA POF', *10th International Plastic Optical Fibres Conference*, Amsterdam, 2001

38. R Wirth, C Karnutsch, S Kugler, S Thaler, K Streubel, 'Red and Orange RCLEDs', *Proceedings of the SPIE: Light-Emitting Diodes: Research, Manufacturing, and Applications V*, Vol 4278, 41-49, 2001

Patents

(http://ep.espacenet.com; http://www.uspto.gov/patft/index.html)

1. C Karnutsch, N Linder, W Schmid, *Optically pumped semiconductor device*, OSRAM Opto Semiconductors, Regensburg, Germany, Publication info: CN1947316-2007-04-11, TW262640B-2006-09-21, KR20070005017-2007-01-09
2. N Linder, C Karnutsch, W Schmid, J Luft, S Lutgen, *Optically pumped radiation-emitting semiconductor-device and its production method,* OSRAM Opto Semiconductors, Regensburg, Germany, Publication info: TW250708B-2006-03-01
3. C Karnutsch, P Stauss, K Streubel, *Electromagnetic radiation-emitting semiconductor-chip and its production method,* OSRAM Opto Semiconductors, Regensburg, Germany, Publication info: TW244219B-2005-11-21
4. C Karnutsch, P Stauss, K Streubel, *Method for producing an electromagnetic radiation-emitting semiconductor chip and a corresponding electromagnetic radiation-emitting semiconductor chip,* OSRAM Opto Semiconductors, Regensburg, Germany, Publication info: US2006003467-2006-01-05
5. J Luft, S Lutgen, W Schmid, N Linder, C Karnutsch*, Semiconductor edge emitting laser has active layer on resonator axis and epitaxially grown resonating mirrors on the side surfaces of the semiconductor body,* OSRAM Opto Semiconductors, Regensburg, Germany, Publication info: DE10323860-2004-11-11
6. R Wirth, C Karnutsch, K Streubel*, Radiation emitting semiconducting component has radiation generating active layer between 2 distributed Bragg reflectors forming optical resonator; active layer thickness exceeds resonator wavelength*, OSRAM Opto Semiconductors, Regensburg, Germany, Publication info: DE10253908-2004-04-08
7. K Streubel, I Pietzonka, C Karnutsch*, Electromagnetic radiation-emitting semiconductor component used as an illuminating diode has an electrically conducting covering layer which is p-doped using carbon to produce good electrical conductivity,* OSRAM Opto Semiconductors, Regensburg, Germany, Publication info: DE10253160-2004-03-11

8. C Karnutsch, P Stauss, K Streubel, *Method for producing an electromagnetic radiation-emitting semiconductor chip and a corresponding electromagnetic radiation-emitting semiconductor chip,* OSRAM Opto Semiconductors, Regensburg, Germany, Publication info: US7,195,991

Published patent applications

9. C Karnutsch, N Linder**,** J Luft, S Lutgen, W Schmid*, Semiconductor optical pumping device for radiation emission and the production method thereof,* OSRAM Opto Semiconductors, Regensburg, Germany, Publication info: US20060104327

Recent Talks and Presentations (last two years)

1. 'Organic semiconductor lasers', **invited** talk presented at Macquarie University, Sydney, Australia, November 2007
2. 'Low-threshold blue vertically emitting polyfluorene DFB lasers employing first-order feedback', contributed talk presented at SPIE Optics&Photonics, San Diego, US, August 2006
3. 'Low-threshold organic semiconductor lasers', **invited** talk presented at the Optical Society of America Meeting, Rochester Section, Rochester, US, August 2006
4. 'Low-threshold organic semiconductor lasers', **invited** talk presented at the National Institute of Standards and Technology (NIST), Boulder, US, August 2006
5. 'Low threshold blue conjugated polymer DFB lasers', contributed talk presented at the Conference on Lasers and Electro-Optics (CLEO), Long Beach, US, May 2006
6. 'Low-threshold organic semiconductor lasers', **invited** talk presented at SPIE Photonics Europe, Strasbourg, April 2006