

# Daniele Baretin

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| <p>Via Fiume Bianco 47a<br/>00144, Rome<br/>Italy</p> <p>Italian citizen<br/>Date and place of birth: Rome, 11/06/1970</p> <p>Compulsory military service with<br/>the Italian Red Cross.<br/>Discharged with letter of distinction.</p> |  | <p>+ 39 - 338 - 4114108 (mobile)<br/><a href="mailto:Daniele.Baretin@uniroma2.it">Daniele.Baretin@uniroma2.it</a><br/><a href="mailto:danybaret@gmail.com">danybaret@gmail.com</a></p> |
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| Education and Professional Background |  |
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| 1984 – 1989                           | <b>Classical high school Diploma</b> at Liceo Classico Socrate, Rome, Italy.<br>Maximum grade: 60 / 60   |
| May 2005                              | <b>Masters Degree, Theoretical Physics</b> at University of Rome – La Sapienza, Rome, Italy.<br>Grade: 106 / 110<br>Specialized in Statistical Mechanics, Complex Systems Physics, Numerical Simulations and modelling, Solid State Physics.<br>Completed one-year (2004 -2005) theoretical and experimental thesis: "Two algorithms for finding ground states: a numerical comparison". |
| Sept 2006 – Aug 2009                  | <b>Ph.D. project</b> at the Mads Clausen Institute, University of Southern Denmark, Denmark and FTP QUEST program, Denmark.<br>Project Title: "Bandgap Engineering and modeling of Quantum Dots ".<br>Ph.D. advisors: Morten Willatzen and Benny Lassen.   |
| Nov 2008 – Apr 2009                   | <b>Visiting researcher</b> in the group of Professor Gerhard Klimeck, Purdue University, Indiana, USA.   |
| Sept 26 2009                          | Conclusion of Ph.D. project. Ph.D. Thesis, ""Multiphysics effects in quantum-dot structures".  |
| Jan 12 2010                           | <b>Ph.D. degree</b> in Applied Mathematical Modelling .  |
| Oct 2009 – Aug 2010                   | <b>Post-doctoral researcher</b> at the Mads Clausen Institute, University of Southern Denmark, Denmark.  |
| Sept 2010 – Aug 2012                  | <b>External consultant</b> for the Mads Clausen Institute, University of Southern Denmark.   |

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| From Feb 2011  | <b>Post-doctoral researcher</b> for the OLAB -- Department of Electronic Engineering, University of Rome Tor Vergata.   |
| October 2011   | <b>Visiting researcher</b> in the group of Professor Vadim Evtikhiev, A. F. Ioffe Institute, Saint Petersburg, Russia.  |
| November 2011-<br>October 2012   | <b>Winner of grant: Progetto Cariplo 2010-0525- Highly efficient organic solar cells based on surface nanostructuring of innovative hybrid materials for light-trapping:</b><br>One year Post-doctoral position University of Rome - Tor Vergata. |
| April – May<br>October – November<br>2012                                    |   |
| March – May 2013<br>June – July 2014<br>June – July 2015<br>June – July 2016 | <b>Visiting researcher</b> at A. F. Ioffe Institute, Russian Academy of Science, Saint Petersburg, Russia.  |
| April 2013 –<br>May 2015   | <b>Winner of grant: NewLED Nanostructured Efficient White LEDs based on short-period superlattices and quantum dots (EU - 7h Framework Programme):</b><br>Two years Post-doctoral position University of Rome - Tor Vergata.                      |
| January-May 2015   | <b>Winner of grant from VILLUM FOUNDATION within Young Investigator Programme of prof. Elizaveta Semenova :</b><br>Five months visiting Post-doctoral position, Technical University of Denmark, DTU - Copenhagen, DK.                            |
| From March 2016  | <b>Researcher (Assistant Professor) UNICUSANO</b> , University Niccolò Cusano, Rome Italy.  |

| Teaching Activities |   |
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| Sept – Dec 2007     | Teaching instructor M.Sc. course: "Mechanical Vibrations" at University of Southern Denmark, Faculty of Engineering |
| March – May 2008    | Teaching instructor Bachelor course: "Thermodynamics" at University of Southern Denmark, Faculty of Engineering.    |
| From October 2015   | Solid State Electronics, UNICUSANO, University Niccolò Cusano, Rome Italy.  |
| From March 2016     | General Physics (Mechanics – Thermodynamics) UNICUSANO, University Niccolò Cusano, Rome Italy.                      |

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| <b>Scholarships and other academic activities</b> |   |
| <b>From Sept 2006</b>                             | Member of MESO (Mesoscopic Structures, Dynamic and Optics) - Research Training Program for Nanotechnology and Functional Materials - University of Southern Denmark.                                  |
| <b>August 2007 Scholarship</b>                    | International Summer School "Sensing and manipulating at the frontier of optics: from the meso- to the nanoscale", University of Southern Denmark, Sonderborg, Denmark.                               |
| <b>August 2007 Scholarship</b>                    | 61st European Study Group for Industry in Mathematics +DCAMM Research School, University of Southern Denmark, Sonderborg, Denmark.  |
| <b>November 2007 Workshop</b>                     | Invited as participant to the workshop: "Physics-Based Mathematical Models of Low-Dimensional Semiconductor Nanostructures: Analysis and Computation", International Research Station, Banff, Canada. |

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| <b>Referee Service</b> |   |
|                        | Physical Review Letters<br>Physical Review A, B<br>Physica E.<br>Optical and Quantum Electronics. |

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| <b>Language Skills</b> |                  |  |
|                        | Italian – Native | English – Excellent<br>(Certificate of Advanced English – Cambridge University)<br>Russian – Very good<br>Danish - Basic |

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| <b>IT Skills</b> |   |
| <b>Generic</b>   | Extensive computer experience: Operating Systems (Windows, Unix, Linux), Office package.  |
| <b>Specific</b>  | Programming Languages (C, Fortran, Matlab, Bash), Data analysis (Awk, Gnuplot), extensive experience with COMSOL platform and TiberCAD. |

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| <b>Personal interests</b> |   |
|                           | Theater. Two-year experience assistant director in a professional Italian troupe.<br><br>Sports. Competitive Swimmer : several attendances at the Italian national senior championships, two victories at the regional Southern Denmark senior championships.<br><br>Writing. Several short stories published in Italian magazines. |

| Publications        |  |
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| Journal Publication | <ol style="list-style-type: none"> <li data-bbox="528 304 1477 398">1. B. Lassen, D. Baretin, M. Willatzen, and L.C. Lew Yan Voon, <i>Piezoelectric models for semiconductors quantum dots</i>, Microelectronics Journal, 39 (11), 1226 (2008).</li> <li data-bbox="528 443 1477 568">2. D. Baretin, J. Houmark, B. Lassen, M. Willatzen, T. R. Nielsen, J. Mork, and A.-P. Jauho, <i>Analysis of optical properties of strained semiconductor quantum dots for electromagnetically induced transparency</i>, Phys. Rev. B 80, 235304 (2009).</li> <li data-bbox="528 613 1477 707">3. D. Baretin, S. Madsen, B. Lassen, and M. Willatzen, <i>Comparison of wurtzite atomistic and piezoelectric continuum strain models: Implications for optical properties</i>, Superlattices and Microstructures 47, 134 (2010).</li> <li data-bbox="528 752 1477 815">4. B. Lassen, M. Willatzen, and D. Baretin, <i>Band-mixing and strain effects in InAs/GaAs quantum ring</i>, Superlattices and Microstructures, 47, 103 (2010).</li> <li data-bbox="528 860 1477 922">5. D. Baretin and P. Sibani, <i>Entropic algorithms and the lid method as exploration tools for complex landscapes</i>, Phys. Rev. E 84, 036706 (2011).</li> <li data-bbox="528 967 1477 1061">6. D. Baretin, S. Madsen, B. Lassen, and M. Willatzen, <i>Computational Methods for Electromechanical Fields in Nanostructures</i>, Commun. Comput. Phys., 11, pp 797-83 (2012).</li> <li data-bbox="528 1106 1477 1209">7. D. Baretin, A. Di Carlo, R. De Angelis, M. Casalboni, P. Proposito, <i>Effect of dielectric Bragg grating nanostructuring on dye sensitized solar cells</i>. Optics Express 20 (106), A888-A897 (2012).</li> <li data-bbox="528 1254 1477 1424">8. D. Baretin, A. V. Platonov, A. Pecchia, V. N. Kats, George E. Cirlin, I. P. Soshnikov, A. D. Bouravleuv, L. Besombes, H. Mariette, M. Auf der Maur, and A. Di Carlo, <i>Model of a GaAs quantum dot embedded in a polymorph AlGaAs nanowire</i>, Selected Topics in Quantum Electronics, IEEE Journal of 19 (5), 1901209 (2013).</li> <li data-bbox="528 1469 1477 1532">9. D. Baretin and P. Sibani, <i>Optimization by Record Dynamics</i>, Computer Physics Communications 185 (3), 730–735 (2014).</li> <li data-bbox="528 1576 1477 1702">10. D. Baretin, R. De Angelis, P. Proposito, M. Auf der Maur, M. Casalboni, and A. Pecchia, <i>Model of a realistic InP surface quantum dot extrapolated from atomic force microscopy results</i>, Nanotechnology 25 (19), 195201 (2014).</li> <li data-bbox="528 1747 1477 1881">11. D. Baretin, R. De Angelis, P. Proposito, M. Auf der Maur, M. Casalboni, and A. Pecchia, <i>Inter-dot strain field effect on the optoelectronic properties of realistic InP lateral quantum-dot molecules</i>, Journal of Applied Physics 117, 9 (2015).</li> </ol> |

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| <p><b>Peer-reviewed Proceeding Publications</b></p> | <ol style="list-style-type: none"> <li>1. D. Baretin, B. Lassen, and M. Willatzen, <i>Electromechanical fields in Ga/AlN Wurtzite Quantum Dots</i>, J. Phys. Conf. Ser. 107, 012001 (2008).</li> <li>2. B. Lassen, M. Willatzen, D. Baretin, R. V. N. Melnik, and L. C. Lew Yan Voon, <i>Piezoelectric effect and spontaneous polarization in GaN/AlN quantum dots</i>, J. Phys. Conf. Ser. 107, 012008 (2008).</li> <li>3. B. Lassen, D. Baretin, M. Willatzen, <i>Strain in inhomogeneous InAs/GaAs quantum-dot structures</i>. Journal of Physics: Conference Series 367 (1), 012007 (2012).</li> <li>4. E.S. Semenova, I.V. Kulkova, S. Kadkhodazadeh, D. Baretin, O. Kopylov, A. Cagliani, K. Almdal, M. Willatzen, K. Yvind, <i>Epitaxial growth of quantum dots on InP for device applications operating at the 1.55 <math>\mu\text{m}</math> wavelength range</i>, SPIE OPTO, 899606-899606-9 (2014).</li> </ol>  |
| <p><b>Conference Contributions</b></p>              | <ol style="list-style-type: none"> <li>1. D. Baretin, B. Lassen, and M. Willatzen, <i>Electromechanical fields in GaN/AlN Wurtzite Quantum Dots</i>, Poster, Physics-Based Mathematical Models of Low-Dimensional Semiconductor Nanostructures: Analysis and Computation (Banff 2007).</li> <li>2. B. Lassen, M. Willatzen, D. Baretin, R. V. N. Melnik, and L. C. Lew Yan Voon, <i>Piezoelectric effect and spontaneous polarization in GaN/AlN quantum dots</i>, Talk, Physics-Based Mathematical Models of Low-Dimensional Semiconductor Nanostructures: Analysis and Computation (Banff 2007).</li> <li>3. L.C. Lew Yan Voon, B. Lassen, D. Baretin, and M. Willatzen, <i>Semiconductor quantum dots and piezoelectric models</i>, Talk, CLACSA XIII (Santa Maria, Colombia 2007).</li> <li>4. M. Willatzen, B. Lassen, D. Baretin, and L.C. Lew Yan Voon <i>Piezoelectric models for semiconductors quantum dots</i>, Talk, APS March Meeting (New Orleans, Louisiana 2008).</li> <li>5. M. Willatzen, B. Lassen, D. Baretin, and L.C. Lew Yan Voon <i>Piezoelectric models for semiconductors quantum dots</i>, W28.00009, Proceeding of the American Physisc Society, New Orleans, Louisiana, USA, March 10-14 (2008).</li> <li>6. L.C. Lew Yan Voon, B. Lassen, D. Baretin, and M. Willatzen, <i>Semiconductor quantum dots and piezoelectric models</i>, Proceeding of CLACSA XIII (Santa Maria, Colombia 2008).</li> <li>7. D. Baretin, B. Lassen, M. Willatzen, R.V.N. Melnik, and L.C. Lew Yan Voon, <i>Three-dimensional strain distributions due to anisotropic effects in InGaAs semiconductor quantum dots</i>, Talk, WCCM8-ECCOMAS (Venice 2008).</li> </ol> |

8. J. Houmark, D. Baretin, B. Lassen, T. R. Nielsen, J. Mork, A.-P. Jauho, and M. Willatzen, *Analysis of quantum dot EIT based on eight-band  $k^*p$  theory*, Poster, ICPS (Rio de Janeiro, 2008).
9. B. Lassen, D. Baretin, and M. Willatzen, *Cylindrical symmetry and spurious solutions in 8 band  $k^*p$  theory*, Poster, ICPS (Rio de Janeiro, 2008).
10. D. Baretin, S. Madsen, B. Lassen, and M. Willatzen, *Comparison of wurtzite atomistic and piezoelectric continuum strain models: Implications for optical properties*, Poster, PLMN09 (Lecce 2009).
11. B. Lassen, M. Willatzen, and D. Baretin, *Band-mixing and strain effects in InAs/GaAs quantum ring*, Talk, PLMN09 (Lecce 2009).
12. D. Baretin, S. Madsen, B. Lassen, and M. Willatzen, *Comparison of atomistic and continuum quantum-dot elastic models and implications for optoelectronic properties*, Poster, ICPS (Seoul, 2010).
13. D. Baretin, S. Madsen, B. Lassen, and M. Willatzen, *Comparison of atomistic and continuum quantum-dot elastic models and implications for optoelectronic properties*, Proceeding of ICPS (Seoul, 2010).
14. D. Baretin, A. Pecchia, G. Penazzi, M. Auf der Maur, B. Lassen, M. Willatzen, and A. di Carlo, *Comparison of continuum and atomistic methods for the analysis of InAs/GaAs quantum dots*, Talk, Nusod (Rome, 2011).
15. M. Willatzen, B. Lassen, S. Madsen, D. Baretin, *Strain and piezoelectric effects in quantum-dot structures*, Invited Talk, Nusod (Rome, 2011).
16. D. Baretin, A. Pecchia, G. Penazzi, M. Auf der Maur, B. Lassen, M. Willatzen, and A. Di Carlo, *Comparison of continuum  $k^*p$  and atomistic Tight Binding methods for the analysis of InAs/GaAs quantum dots*, TMCS III (Leeds, 2012).
17. D. Baretin, A. V. Platonov, A. Pecchia, V. N. Kats, G. E. Cirlin, I. P. Soshnikov, A. D. Bouravleuv, L. Besombes, H. Mariette, M. Auf der Maur, A. di Carlo, *Modelling of GaAs quantum dot embedded in a polymorph AlGaAs nano wire*, Talk Nusod (Vancouver, 2013).
18. Daniele Baretin , Matthias Auf der Maur , Alessandro Pecchia , and Aldo di Carlo, *Realistic modeling of nanostructured quantum dots from experimental results*, 22nd Int. Symp. "Nanostructures: Physics and Technology" (Saint Petersburg, Russia 2014 ).
19. M. Auf der Maur, D. Baretin, A. Pecchia and Aldo di Carlo, *Random alloy fluctuations effects on the spontaneous emission properties of a InGaN/GaN LED*, 16 th International Conference Laser Optics (Saint Petersburg, Russia 2014 ).

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|  | <p>20. M Auf der Maur, D Baretin, A Pecchia, F Sacconi, A Di Carlo, <i>Effect of alloy fluctuations in InGaN/GaN quantum wells on optical emission strength</i>, Numerical Simulation of Optoelectronic Devices, 2014.</p> <p>21. Daniele Baretin, Matthias Auf der Maur, Alessandro Pecchia, Walter Rodrigues, Andrei F Tsatsulnikov, Alexei V Sakharov, Wsevolod V Lundin, AE Nikolaev, Nikolay Cherkashin, Martin J Hÿtch, Sergey Yu Karpov, Aldo di Carlo, <i>Realistic model of LED structure with InGaN quantum-dots active region</i>, IEEE 15th International Conference on Nanotechnology (IEEE-NANO) (2015).</p> |
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