

# Giovanni B. Bachelet: curriculum vitae

Born in Rome in 1955. Maturità Classica (60/60), Liceo Mamiani, Rome. Laurea in Fisica (110/110 *summa cum laude*), Sapienza University of Rome; Thesis on surface excitons, under the supervision of M. Altarelli, F. Bassani and R. Del Sole. Since then employed at:

[Bell Labs](#), Murray Hill, NJ (1979-1981); [Scuola Normale Superiore](#), Pisa (1981-1982); [Max-Planck-Institut für Festkörperforschung](#), Stuttgart (1982-1984); CNR, Centro Fisica Stati Aggregati ed Impianto Ionico, Trento (1984-1988) and [University of Trento](#) (Associate Professor, 1988-1991), [La Sapienza](#), Roma (Associate Professor, 1991-1999; Full Professor, 2000-present).

My field is the theory of electronic states. Between 1979 and 1981 I have contributed, with M. Schlüter and D. R. Hamann, to the development of electron-ion potentials, by now a standard tool in electronic-structure calculations. Later on, in the groups of F. Bassani (Pisa), O.K. Andersen (Stuttgart) and G. Jacucci (Trento), I have used these "[norm-conserving pseudopotentials](#)" to study defects, surfaces and interfaces in semiconductors. The study of solids has periodically led me back to atoms, many-fermion theory and Density Functional Theory. In collaboration with D.M. Ceperley I defined in the late eighties a [novel pseudohamiltonian for quantum Monte Carlo](#) and went on working on pseudopotential theory vs. QMC for a few more years, then on electronic correlations in model quantum systems like the 2D Hubbard Hamiltonian and the homogeneous electron gas in 2D and 3D, including a modified e-e interaction ([1](#), [2](#)), of interest for new formulations of the Density Functional Theory. In the last ~15 years I have studied the electron-phonon interaction in superconducting [MgB<sub>2</sub>](#), [CaAlSi](#), [graphite intercalation compounds](#) as CaC<sub>6</sub>, and, more recently, in high-pressure polyhydrides (see e.g. # [39](#), [40](#), and [42](#) of the [publication list](#)).

I have published about [50 papers](#) in collaboration with [students](#) and [colleagues](#) from various part of the world, with shorter and longer visits at Berkeley (1987), Urbana (1989), KITP Santa Barbara (1994; 2002), Cornell (1998), [presenting](#) my results at conferences and schools in Europe and the USA. These results have altogether received, so far, about 7400/5400 citations,\* of which about 4000/3000 belong to my most-cited article, [Pseudopotentials that work](#) (which in 2004 ranked #49 out of the [100 most cited Physical Review articles of all times](#)), and about 500/350 to my 2002 [study on the correlation energy and spin polarization of the 2D electron gas](#), my second most-cited article; my h-index is 28/26.

Over the years I have supervised ~[60 theses and dissertations](#) and held a few specialistic [lecture courses](#) in Italy and abroad, plus regular graduate and undergraduate courses on Many Body Theory (1987-1991), Electromagnetism (1991-94; 2001), Condensed Matter Physics (1993-95; 2000), Quantum Theory of Solids (1995-2004), Elementary Mechanics [I](#) and [II](#) to Physics freshmen (2002-2006), [Numerical Methods for Quantum Systems](#) (2005, 2006), a basic course on Atomic, molecular and solid-state physics (2007-2008, [2016-present](#) ; its lecture notes were published as a booklet in 2014, [reprinted](#) in 2017), Condensed Matter Physics (2008), the first course of [Mechanics and Thermodynamics](#) to Math freshmen (2013-2015), and advanced courses on [Computational Condensed-Matter Physics](#) (2014, 2015), Computational Statistical Mechanics ([2016](#), [2017](#), [2018](#), [2019](#)), and Computing Methods for Physics ([2020](#), [2021](#)).

[Scientific and managing](#) responsibilities have absorbed quite some energy. I have been PI of the national program "[Statistical mechanics and strongly correlated systems](#)" (1997-1999), Head of the Condensed Matter Area of my Department (2005-2008), Review Committee member for the [European Synchrotron Radiation Facility](#) (2007-2009). But the most demanding community service came with my [election to the Italian Parliament](#), which implied a 5-year leave of absence (2008-2013). Moreover, shortly after my return to the University, I was elected Director of the Physics Undergraduate and Graduate studies and member of the Faculty Council, so only after 2017 I am finally back to just research and teaching.

\*see [Google Scholar](#) / [Web of Science](#) (last update: 3/2021)