

CURRICULUM VITAE

ANNELE HATAKKA

Name: Annele Inkeri Hatakka, born Saaristo

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www page http://www.helsinki.fi/food-and-environment/research/groups/fungal_biotechnology.html
<http://tuhat.halvi.helsinki.fi/portal/en/person/ahatakka>

Family: Husband Pertti Hatakka since 1970, a son Sampsa, born 1984, MA, doctoral student (history) <http://tuhat.halvi.helsinki.fi/portal/fi/person/shatakka>

Current position

Professor in Environmental Biotechnology, University of Helsinki (invited), 1.8.1997-2007, invited and nominated to permanent position from 01.01.2008.

Responsible for the major topic Biotechnology, orientation Microbial and Environmental Biotechnology, at the Faculty of Agriculture and Forestry, from 2004.

Education

Graduated from Senior Secondary School, Salon yhteislyseo (scores: 6 laudatur)	1966
M.Sc. (Agr. & For.) (Microbiology), Department of Microbiology, University of Helsinki, Finland. Other topics biochemistry, chemistry, and genetics	16.11.1972
Licentiate in Agriculture and Forestry (Microbiology), Department of Microbiology, University of Helsinki, Finland. Other topic technical biochemistry (biotechnology) from Helsinki University of Technology (TKK)	1.9.1979
Dr. Agr. & For. (Microbiology), Department of Microbiology, Univ. of Helsinki	18.9.1986
Docent in microbiology, University of Helsinki	22.12.1986

Professional experience

Research Assistant, the Academy of Finland, Council for Technical Sciences	1972-1974
Research Associate, Academy of Finland, Council for Agric. and For.	1974-1980
Junior Research Fellow, Academy of Finland, Council for Agric. and For.	1980-1988
Acting Senior Research Fellow, Academy of Finland, Council for Agric. and For.	1984
Acting Senior Research Fellow, Academy of Finland, Council for Agric. and For.	1988-1989
Academy Research Fellow grant, Academy of Finland, Council for Agric. and For.	1989-1990
Senior Research Fellow, Academy of Finland, Council for Environment and Natural Resources	1990-1996
Senior Assistant (Microbiology), University of Helsinki, Finland	1996-1997

Working visits abroad

Visiting Scientist (1.3 yrs) at the Department of Chemistry, Swedish Forest Products Research Laboratory (STFI), Stockholm, Sweden, group leader Prof. K.-E.L. Eriksson. Grants from the Academy of Finland, The Foundation for Natural Resources in Finland, and Tröedsson Foundation (Sweden).	1977-1978
Visit (1 month) at Institut National Agronomique (INA-INRA), Paris-Grignon, France (Dr. B. Monties, Dr. E. Odier) to learn radiorespirometric methods. Grant from the Ministry of Education in Finland and the Finnish Culture Foundation.	1980
Visiting Scientist (3 months) at Paisley College of Technology, Scotland, U.K.	1982

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Exchange grant from the Royal Society.

Grants and experience as research leader

The research group in October 2014 consists of the Principal Investigator (1), post doctorates (1), doctoral students (5), undergraduate students and trainees. Prof. Annele Hatakka and four university lecturers (*Kristiina Hildén, Pauliina Lankinen, Taina Lundell, Kari Steffen*) and the Academy Fellow (*Jussi Heinonsalo*) and their groups form a joint Fungal Biology and Biotechnology research unit and closely collaborate with each other. Hatakka's group was in 2002-2007 a member of Center of Excellence "*Microbial Resources Research Unit*", nominated by the Academy of Finland, A. Hatakka was the 2nd vice director of the unit.

Major and recent research projects

Microbiological treatment of wood chips for pulping, The National Technology Agency Tekes	1998-2002
Partner EU project QLK3-1999-00590, Fungal metalloenzymes oxidizing aromatic compounds of industrial interest. (9 partners, 9 countries)	2000-2003
Funding for the Center of Excellence "Microbial Resources", funding from The Academy of Finland and from the Univ. of Helsinki	2002-2007
Environment Research Center of the University of Helsinki (HERC), consortium Soil Biology	2001-2007
Grant for a post doctorate from the Academy of Finland	2002-2004
Remediation of wood and soil of old saw mill areas contaminated with chlorinated phenols, dioxins and furans by rot fungi, Maj and Tor Nessling Foundation	2004-2006
INTAS project 03-51-5889 (Blue and non-blue laccases of basidiomycetes) (A. Hatakka coordinator, partners L. Golovleva, Russian Acad. of Science, Pushchino, N. Belova, Komarov Botanical Inst., St. Petersburg, G. Sannia, Naples, Italy).	2004-2007
Participation in the EU project LSHB-CT-2004-503467 (Protein kinases – novel drug targets of postgenomic area) with Acad. Prof. K. Sivonen (24 manmonths)	2004-2008
Utilization of solid state technology in industrial processes, the National Technology Agency Tekes, coordinated by Helsinki Univ. of Technology	2004-2006
Applications in the pulp and paper industry (coordinated by SME company Mycocenter)	2004-2005
EU project FP-6 026456-2 Biorenew: White Biotechnology for added value products from renewable plant polymers (with Dr. J. Sipilä) (coord. Prof. A.T. Martinez, CIB, CSIC, Spain), 26 partners	2006-2010
Removal of organic material from polluted soil using fungi, led by an industrial company Niska & Nyssönen: project belongs to Tekes (The Finnish Funding Agency for Technology and Innovation) research program Symbio	2006-2009
Removal of endocrine disrupters from waste waters using fungal oxidative enzymes. Maj and Tor Nessling Foundation.	2007-2009
BIOKUNTO (Remediation of contaminated soil in situ). Tekes (The Finnish Funding Agency for Technology and Innovation) program Symbio project, coordinated by Prof. M. Romantschuk	2007-2010
Modelling of xenobiotic degradation by basidiomycete laccases (jointly with Prof. L. Golovleva, Russian Acad. of Science, Pushchino), The Academy of Finland.	2008-2010
Two projects paid by industry	2008-2009
EU project NEMO (Novel high performance enzymes and micro-organisms for conversion of lignocellulosic biomass to bioethanol, 2009-2012), with Prof. Liisa Viikari	2009-2012
Production of aliphatic small molecular weight acids from biomass (BioHap) funded by Tekes research program Biorefinery, together with Prof. Liisa Viikari	2008-2011
Bioremediation of contaminated soil fungi (PIMA-FUN) (The Finnish Funding Agency for Technology and Innovation) research program Symbio (coordinator Dr. Marja Tuomela)	2009-2012
Oxidoreductases and natural type mediators in fungal conversion of lignocellulose and lignin (LUOMUKAT) The Academy of Finland, 588.980 €	2010-2012
Marie Curie reintegration funding on Fungi in white biotechnology: Expression of novel lignocellulose degrading enzymes (PERG08-GA-2010-276794-FunBio) to Dr. Kristiina Hildén	2011-2012
CIMO grant, 8 months to Sadegh Mansouri on Construction of recombinant <i>Pichia pastoris</i> yeast by inulinase gene of native fungi	2011
SUBICAT (Sustainable biomass conversions by highly efficient catalytic processes) (Marie Curie ITN -project nr. 607044, FP7-PEOPLE-2013-ITN Marie Curie Actions – Initial Training Networks (ITN), Multi-partner ITNs) 48 months (K. Hildén as responsible researcher at UH).	2013-2017
OPTIBIOCAT Optimized esterase biocatalysts for cost-effective industrial production. EU project nr 613868. Optimal and cost-effective industrial biocatalysts Project start date:	2013-2017

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[2013-12-01] (K. Hildén as responsible researcher at UH)

University of Helsinki, funded position to Johanna Rytioja from Microbiology and Biotechnology Doctoral Program (MBDP) on “Tools for environmentally benign processes: Cellulolytic enzymes of basidiomycetous white-rot fungi for bioethanol and novel nanocellulose applications” 2014

Previous EU and INTAS project

Associated contractor (6 partners, 5 countries) in the project Design and scale-up of a bioprocess for the production of natural vanillin from agricultural byproducts, funded by EU project FAIR-CT96-1099 1996-1999

Contractor (8 partners, 5 countries) in the project Biological delignification in paper manufacture: EU project AIR2-CT93-1219 1994-1997

Coordinator of INTAS-94-1195. Other partners Russia and UK 1995-1997

Supervisory of students

Former post doctorates and members of the group

1. Docent Taina Lundell, university lecturer in microbiology, University of Helsinki
2. Prof. Martin Hofrichter, Prof. in Environmental Biotechnology 2001 →, Intl. Grad. Institute IHIZ, Zittau, Germany
3. Docent Pekka Maijala, Project Manager at Seinäjoki University of Applied Sciences (Seinäjoki UAS), Finland
4. Dr. Pauliina Lankinen, university lecturer in biotechnology, University of Helsinki
5. Docent Kari Steffen, acting university lecturer in microbiology at University of Helsinki
6. Docent Mika Kähkönen, research scientist at University of Helsinki
7. Dr. Marja Tuomela, visiting research scientist at University of Helsinki
8. Dr. Jussi Heinonsalo, Academy Fellow (akatematutkija) 1.8.2012 – 31.7.2017, University of Helsinki
9. Docent Kristiina Hildén, university lecturer in microbial biotechnology, University of Helsinki, from 1.8.2012
10. Dr. Miia Mäkelä, post doctorate in EU project

Supervised or co-supervised 12 doctoral theses

1. *Taina Lundell* (1993) Ligninolytic system of the white-rot fungus *Phlebia radiata*: Lignin model compound studies; university lecturer (permanent) at University of Helsinki (UH)
2. *T. Vares* (1996) Ligninolytic enzymes and lignin-degrading activity of taxonomically different white-rot fungi
3. *Marja Tuomela* (2002) Degradation of lignin and other ¹⁴C-labelled compounds in compost and soil with an emphasis on white-rot fungi
4. *Kari Steffen* (2003) Degradation of recalcitrant biopolymers and polycyclic aromatic hydrocarbons by litter-decomposing basidiomycetous fungi (received 2004 the first prize for the best doctoral thesis in series “Dissert. Biocentri Viikki Universitatis Helsingiensis”); presently university lecturer (acting), in microbiology at UH
5. *Pauliina Lankinen* (2004) Ligninolytic enzymes of the basidiomycetous fungi *Agaricus bisporus* and *Phlebia radiata* on lignocellulose-containing media; presently university lecturer (permanent) in biotechnology at UH
6. *Terhi K. Hakala* (2007) Characterization of the lignin-modifying enzymes of the selective white-rot fungus *Physiporinus rivulosus*; presently scientist at VTT
7. *Beata Kluczek-Turpeinen* (2007) Lignocellulose degradation and humus modification by the fungus *Paecilomyces inflatus*.
8. *Outi Niemenmaa* (2008) Monitoring of fungal growth and wood degradation; retired.
9. *Miia R. Mäkelä* (2009) The white-rot fungi *Phlebia radiata* and *Dichomitus squalens* in wood-based cultures: expression of laccases, lignin peroxidases, and oxalate decarboxylase; post doc in K. Hildén’s group
10. *Lara Valentin Carrera* (2010) Two *ex situ* fungal technologies to treat contaminated soil; post doc at Prof. T. Vicent’s group (Department of Chemical Engineering of the University Autònoma of Barcelona, Spain)
11. *Päivi Järvinen* (2011) Assessment of in-house natural product and synthetic compound libraries based on *in vitro* inhibition of cholinesterases, Fac. of Pharmacy, Univ. of Helsinki
12. *Grit Kabiersch* (2013) Fungal tools for the degradation of endocrine disrupting compounds. Post doc at Dept. Food and Environmental Sciences, University of Helsinki (grant from Maj and Tor Nessling Foundation)

Presently doctoral students under supervision in Fungal Biology and Biotechnology research unit

- Johanna Rytioja (funded 1.1. – 31.12.2014 by Microbiology and Biotechnology doctoral programme (MBDP), supervisors M. Mäkelä and K. Hildén)
- Sadegh Mansouri (supervisors Pauliina Lankinen and Kristiina Hildén)
- Festus Anasonye (funded by Maj and Tor Nessling foundation, grant to Marja Tuomela)

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- Outi-Maaria Sietiö
- Sari Galkin
- Anu Kinnunen (funded by Maj and Tor Nessling Foundation from 2014, grant to Mika Kähkönen)

Supervised M.Sc. theses and equivalent foreign theses

over 10 and co-supervised several M.Sc. theses and diploma theses for polytechnics.

Administration in doctoral programs (Graduate Schools)

Member of the board of EnSTe GS (GS in Environmental Sciences and Technology) 2007-2014; Supervisor of ABS - Applied Bioscience, and Viikki Graduate School of Biosciences and Molecular Biology (VGSB).

Publications and other scientific activities

Publications: 227 articles and reports (**112 original and 3 review articles in refereed journals, 85 chapters and articles** in scientific books or congress proceedings books and discs, 17 other reports, articles and teaching material, and general articles). In addition **3 theses, 4 patents**, (1995, 2003, 2005, 2009), **ca. 210 congress abstracts**. A. Hatakka in Web of Science (15.10.2014 core collection): H-index 32, sum of times cited 3,728, average citations per item 26.82. The review Hatakka (1994) (FEMS Microbiology Reviews 13:125-135) has been cited 540 times (WoS) or 587 times (Scopus) and is among the six most cited reviews in the area of lignin biodegradation (Scopus). Other most cited articles (WoS) are Tuomela et al. (2000) 312x, Hatakka & Uusi-Rauva (1983) 104x, Vares, Kalsi & Hatakka (1995) 99x. The book chapter Hatakka (2001) (Biodegradation of lignin, in Biopolymers 1:129-180), has been cited 165 times (Scopus).

Participated congresses and symposia and given (from 1990) 57 lectures

mainly in international congresses and seminars in the USA (11 times), France (several times), Great Britain (several times), Soviet Union (several times), Canada (3 times), Japan (twice), Portugal (several times), Austria (3 times), Spain (several times), Germany (several times), China, Australia, New Zealand, Czechoslovakia, Sweden, Denmark, Poland, Czech Republic, Brazil, Greece, Slovenia, Italy, South Africa, Russia, Latvia, and in congresses in Finland.

Session chairperson

In international congresses e.g. in Japan (1988, 1992), Portugal (1993, 2006: 3rd European Meeting in Oxizymes, Oeiras), Finland (XXII Intl. Conf. on Polyphenols, 2004), South Africa (9th Intl. Conf. on Biotechnol. in the Pulp and Paper Industry, 2004), Spain (Biotechnology for Pulp and Paper manufacture, COST E23 Conf., 2005), Germany (ISEB/ESEB, Leipzig, 2006).

Invited lectures

in Portugal (1993), Czech Republic (1994), Canada (1994), Brazil (1995), Germany (1998), and keynote lectures in Crete, Greece (2001) and in plenary session in International & European Symposium on Environmental Biotechnology ISEB/ESEB, Leipzig, Germany, July 9-13, 2006. Invited plenary lecture in *Intl. Conf. Biodeterioration of Wood and Wood Products* Riga, Latvia, August 26-29, 2007, and Tampere, Finland, at Peroxidases 2008.

Chairperson and organizer

with the research group, of the Symposium on Lignin Biodegradation and Biosynthesis, Viikki Biocenter, June 3-4, 2001 (200 participants from 29 countries).

Member of organizing and program committees of congresses: the 8th *International Conference of Biotechnology in the Pulp and Paper Industry (ICBPPI)*, June 4-8, 2001, Finlandia Hall, Helsinki, Finland.

Member of scientific program committees: 9th ICBPPI, 10-14 October, 2004, Durban, South Africa; 10th ICBPPI in Madison, WI, USA June 10-14, 2007; ISEB/ESEB 2006 (International & European Symp. on Environmental Biotechnology), Leipzig, Germany, July 9-13, 2006; *Intl. Conf. Biodeterioration of Wood and Wood Products*, August 26-29, 2007, Riga, Latvia; 4th *European Meeting in Oxizymes*, June 16-18, 2008; 8th *Intl. Peroxidase Symposium*, 20-24 August 2008, Tampere, Finland. *Lignobiotec One Symposium (11th ICBPPI)* 28.3.-1.4.2010, Rheims, France; *Oxizymes in Leipzig*, 14.-16.6.2010 Leipzig, Germany; *Oxidative Enzymes as Sustainable Industrial Biocatalysts*, 14.-15.9.2010, Santiago de Compostela, Spain. *Oxizymes in Marseille* 16.-19.9.2012; *Lignobiotec II Symposium (2nd Symposium on Biotechnology Applied to Lignocelluloses)*, ACROS Fukuoka, Japan, October 14-17, 2012 (invited). 5th FEMS Microbiology Congress, Leipzig, Germany, July 21-25, 2013 (invited).

Member of scientific program committees: 9th ICBPPI, 2004, Durban, South Africa; 10th ICBPPI in Madison, WI, USA, 2007; ISEB/ESEB 2006 (Intl. & European Symp. on Environmental Biotechnology), Leipzig, Germany, 2006; Intl. Conf. Biodeterioration of Wood and Wood Products, 2007, Riga, Latvia; 4th European Meeting in Oxizymes, 2008; 8th Intl. Peroxidase Symposium, 2008, Tampere, Finland. Lignobiotec One Symposium (11th ICBPPI) 2010, Rheims, France; Oxizymes in Leipzig, 2010 Leipzig, Germany; Oxidative Enzymes as Sustainable Industrial Biocatalysts, 2010, Santiago de Compostela, Spain, Lignobiotec II Symposium (2nd Symposium on Biotechnology Applied to Lignocelluloses), ACROS Fukuoka, Japan, October 14-17, 2012 Oxizymes in Marseille 2012; FEMS2013 (5th Congress of European Microbiologists, Leipzig, Germany, July 21-25, 2013), Oxizymes in Vienna (1.-4.7.2014).

Management committee member: COST E23 (Biotechnology in the Pulp and Paper Industry) (2000-05); COST 868 (Biotechnical functionalization of renewable polymeric materials) (2006-10).

Working group member (WG1), COST0602 (Biotechnology for lignocellulose biorefineries) (2006-2010).

Expert group in the research evaluation of genetics, physiology, micro- and molecular biology organized by Estonian Ministry of Education (Dec. 2000). Evaluation of the selection of Leading National Scientific Centres (KNOW) of the Polish Ministry of Science and Higher Education, on chemical science, 2012.

Peer reviewer of grant application: e.g. NATO Collaborative Research Grants, US Department of Energy, The International Science Foundation, The Israel Science Foundation (ISF) (founded by The Israel Academy of Sciences and Humanities) 22.5.2003, The Academy of Science of the Czech Republic, 2005. Genoscope, 2005, France. Rasmussen Found., Denmark, 2006. ISTC Global Security & Strategic Planning, Russia, 2006. The Knowledge Foundation (KK-Stiftelsen), Sweden 2007. BBSRC - Capacity Building Awards in Bioenergy Research Initiative, UK, 2008, 2014. Research Council of Norway, 2008. University of Helsinki, Research grants, 2008, 2009. The Volkswagen Foundation, Germany, 2009. Member of Standing evaluation panel for The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas) Sweden 2010, 2011, 2012, 2013; and many other funding bodies.

Guest editor of a special issue of Enzyme and Microbial Technology 16/2002

Member of Editorial Board: Enzyme and Microbial Technology (2007->). Applied and Environmental Microbiology (2014-2016).

Reviewer of manuscripts for more than 40 different journals, e.g. Archives of Biochemistry and Biophysics, Biochim. Biophys. Acta, Microbiology, Biochimie, FEBS Letters, FEMS Microbiology Letters, Soil Biology & Biochemistry, Applied Microbiology and Biotechnology, European J. Biochemistry, Enzyme and Microbial Technology, Fungal Genetics and Biology, Holzforschung, Current Genetics, Chemosphere, Archives of Microbiology, Applied and Environmental Microbiology, J. Haz. Materials, Eukaryotic Cell, Fungal Ecology, Bioresource Technology, Journal of Biotechnol., Journal of Applied Microbiology, Engineering in Life Sciences, Biotechnology for Biofuels and many other journals.

Assessment for docentship

5 times: J. Rintala JY 1997, T. Yli-Mattila TY 1997, M. Kontro HY 2003, Anneli Joutti, Dept. Environ. Ecology, Univ. of Helsinki 2006, Marja Tiirola, Tampere Univ. of Technology 2006.

Assessment for tenured position, university lecturer position at Univ. of Jyväskylä 2014.

Opponent of doctoral dissertations

3 times: L. Raaska 1993, A.-C. Ritschkoff 1996 in the University of Helsinki, Helsinki, Finland; A. Iakovlev 2001 at SLU, Uppsala, Sweden

Pre-reviewer of doctoral theses

6 times: S. Timonen (Univ. of Helsinki 1997), P. Ollikka (Univ. of Turku 1008), Y. Degefu (Univ. of Helsinki 2003), H. Palonen (Helsinki Univ. of Technology 2005), H. Kontkanen (Univ. of Jyväskylä 2006), K. Kreander (Univ. of Helsinki 2006), Yvonne Nygård (Aalto University 2014).

Examiner of licentiate theses

6 times: M. Itävaara, 1989 HY, M. Rättö HY 1990, E. Karhunen, HY 1991, A.-C. Ritschkoff HY 1992, K. Pahkala 1997 HY, S. Elo 2002 HY.

Member in scientific societies Societas Biochemica, Biophysica et Microbiologica Fenniae; The Finnish Chemical Society; Am. Society for Microbiology (ASM) 1998→; Am. Chem. Society (ACS) 2000-2008. TAPPI (Technical Association of the Pulp and Paper Industry) 1997-2008;

Member of the Finnish Academy of Science and Letters, from 2012

University and science administration and positions of trust (selected)***The University of Helsinki***

Member of the Senate (Government) of the University of Helsinki , representing teachers and scholars	1992-1994
Member of the Faculty Council of the Faculty of Agriculture and Forestry	2001-2003
Vice member of the Faculty Council of the Faculty of Agriculture and Forestry	2010-2013
Vice Director of the Department of Applied Chemistry and Microbiology	2004-2006
Member of the Department Council of the Dept. of Food and Environmental Sciences	2010-2013
Member of the Faculty committee for research and doctoral education	2004-2006
Vice Member of the Faculty committee for research and doctoral education	2010-2012
Member of the Steering group of the Helsinki Region Biotechnology Curriculum HEBIOT	2003-2009
Chairperson of the Board for the biotechnology major of the Faculty of Agriculture and Forestry, University of Helsinki	2004 -2011
Coordinator of the Research Groups in Microbiology of the Viikki Biocenter Research Group organization, University of Helsinki	2000-2006
Director of HAMBI Microbial Culture Collection, Department of Food and Environmental Sciences, University of Helsinki	2014-

The Academy of Finland

Member of the Research Council for Biosciences and Environment	2001-2003
The Research Program on Environmental Health SYTTY (1998-2001), vice chairperson of steering group	2001-2002
Research Program Microbes and Man, vice chairperson of the sub-committee (2001-2002), vice chairperson of steering program committee (2002-2003)	2001-2003
Research Program on Systems Biology and Bioinformatics SYSBIO, vice chairperson of subcommittee (2003) and member of steering committee.	2003-2006

Prizes and awards

- Knight, First Class, of the Order of the White Rose of Finland (SVR R 1), granted by the President of the Republic, 6.12.2003;
- XXX. Public Service Medal (XXX) for full-time service of the State more than 30 years, granted by the President of the Republic, 28.11.2008

Achievements in education and related administration**Teaching positions and education as university teacher**

1986-1997	Docent in microbiology, University of Helsinki
1996-1997	Acting senior lecturer (senior assistant) (1 year)
1997-2014	Professor in environmental biotechnology (17 years)
1993-1994	Pedagogical training programme "Laadusta tinkimättä" (66 hours)
2000	Pedagogical training programme "Juonto", Faculty of Agriculture and Forestry

Experience in teaching**Teaching of undergraduate students*****Lecture courses*****Major lecture courses in the past**

- Given a lecture course "Biotechnical utilization of wood and straw" (docent lectures, 2 h/week, 24 h) in 1987, 1988, 1989, 1990, and 1992.
- Given numerous lectures in seminars in the 1970's and 1980's, and lectures e.g. on courses "Basics of biotechnology" and "Industrial and process microbiology", 4-6 h/course, in 1993, 1994, 1995, and on a field course "Microbial ecology and biotechnology" in 1996.

- As senior lecturer in 1996-97 and 1997-2002 as professor given **lecture courses** (4 hours per week per either autumn or spring term, the same course every other year, 2 ov each), 10-25 students per course:
- Microbial biotechnology (YBIOT710) in 1996, 1998, 2000, 2002, 2003
- Ecology and biotechnology of fungi (YBIOT720) in 1999 and 2001.
- Environmental microbiology and biotechnology (YBIOT740) in 1997, 1999 and 2001
- Biotechnology of pulp and paper industry and renewable natural resources (YBIOT750) in 1996, 1998, 2000 and 2002
- A lecture course every year in 1997-2002 (2 hours per week, spring term) ("Scientific communication skills") on writing of scientific articles, research plans and reports, including lectures on ethics.

Lecture courses and lectures (lectures in Finnish)

- YBIOT525 *Fungal biotechnology and biotechnology of renewable natural resources*, annually from 2004 (presently 4 hours/week, period IV) (10-15 students)
- YBIOT315 *Microbial biotechnology*, annually from 2005 (presently 4 hours/week, period II) (20-30 students)
- Biotieteiden perusteet (The basic lecture course on biosciences, part microbiology), 2h lecture on fungi and their biotechnical applications, annually (over 300 students) (from 2012)
- Biotekniikka I (BIOT100) (Biotechnology I) 2 h lecture on environmental biotechnology, annually (30-50 students)

Given lectures in numerous lecture series at the University of Helsinki and in other Finnish universities and elsewhere, also abroad.

Laboratory and field courses

- As a demonstrator ("assistentti") in 1972 (119 h), 1973 (75 h), 1974 (78 h) and in 1975 (54 h) on different level laboratory courses in microbiology and as a teacher on a special method course on "Production and purification of enzymes", several times.
- As a teacher and responsible coordinator of the course on "Analytical methods in microbiology" (2-3 weeks practical work plus seminars) in 1988, 1989, 2 times in 1992, and in 1993. This course has been developed to "Special methods in microbiology" (in 1994).
- As a teacher and responsible of a course in 1996 on "Molecular biological and analytical methods in fungal taxonomy and physiology" (3 weeks practical work, seminar).
- In 1997-2002 has been responsible for two laboratory courses for 10-12 students, practical teaching has been given by other members of my research group:
 - Laboratory and field course of environmental biotechnology (YBIOT330) (3 ov)
 - Analytical methods in microbiology, main emphasis on enzymological methods (YBIOT810) (3 ov)

Proseminars (B.Sc. seminars)

B.Sc. level proseminars for students in biotechnology, twice a year, several years, together with university lecturers from the Department of Biosciences

Supervision of M.Sc. theses

Supervisor or co-supervisor of M.Sc. theses: more than 10.

Teaching of doctoral students

National and international graduate school courses and equivalent

- Teacher on the Fourth Scandinavian Summer School in *Experimental Microbial Ecology* (Biodegradation), Helsinki 5.-16.6.1978
- Teacher on an international *COMETT course Biotechnology for the Pulp and Paper Industries*. Module II. Microbiology and Enzymology for the Pulp and Paper Industries, in Finland 1994 and in Portugal 1995
- Organizer of an Applied Bioscience - Bioengineering, Food & Nutrition, Environment (ABS) Graduate School Course on *Mechanisms and prevention of microbial deterioration of wood products* (2 ov) (14.-23.8.1995), Viikki and Hyytiälä. Some of the participants (13) were also from the Swedish University of Agriculture (SLU), Uppsala, Sweden.
- Organized and given lectures on courses for the graduate school Applied Bioscience (ABS), e.g. lecturer on course *Applied mycology* for Ph.D. students: *Classical and molecular tools for identification* (ABS course)

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- Co-organizer of *Microbial Biotechnology* lecture course for Viikki Graduate School in Biosciences (VGSB) 26.3.-9.4.2001.
- Lecturer on NorFA Course Forest Microbiology, SLU, Uppsala, Sweden, 12.11. 2001.
- Organizer (Pekka Maijala as course secretary) of a NOVA course *Recent Advances in Forest Microbiology: Forest microbes and their role in biodeterioration, biodegradation and biotechnology*, August 19-30, 2002, for about 20 students from Scandinavia and Baltic countries.

Supervision of doctoral students

Supervised or co-supervised doctoral theses (12)

Presently supervising or co-supervising doctoral theses (6)

Supervisor for students of the three graduate schools where the students of the research group are registered or have or have had funding

- Applied Bioscience: Bioengineering, Food & Nutrition, Environment (ABS), until 2013
- Viikki Graduate School of Biosciences (VGSB), until 2013
- The Finnish Graduate School in Environmental Sciences (EnSTe), until 2013
- Microbiology and Biotechnology Doctoral Programme (MBDP) from 2013.

Member of the board of EnSTe Graduate School (2006 -2014)

Supervision of post doctorates (10)

Production of teaching material

Chapters in textbooks of basic microbiology and mycology

Hatakka, A. 2002. Rotting of wood and composting. In: Salkinoja-Salonen, M.S. (ed.) "The Basics of Microbiology", Microbiology Publications 49/2001. Department of Applied Chemistry and Microbiology, University of Helsinki, Gummerus Oy, Jyväskylä, pp. 480-494 (in Finnish).

Hatakka, A. 2013. Sienten bioteknologiset sovellukset. Kirjassa: Sienten biologia. Timonen Sari & Valkonen, J. (toim.). Luku 11.4, ss. 372-384 [Biotechnological applications of fungi. In: Biology of Fungi, Timonen, S.& Valkonen, J. (eds.) Chapter 11.4, pp. 372-384.] Gaudeamus Oy. ISBN 978-952-495-297-2 (in Finnish)

Review articles used on lecture courses

Hatakka, A. 1994. Lignin-modifying enzymes from selected white-rot fungi: production and role in lignin degradation. FEMS Microbiology Reviews 13:125-135.

Tuomela, M., Vikman, M., Hatakka, A. & Itävaara, M. 2000. Biodegradation of lignin in the compost environment: A review. Bioresource Technol. 72(2):169-183.

Hatakka, A. 2001. Biodegradation of lignin. In: Biopolymers. Biology, Chemistry, Biotechnology, Applications. Vol 1. Lignin, Humic Substances and Coal (Hofrichter, M. & Steinbüchel, A., eds.), Wiley-VCH, Weinheim, Germany. Chapter 5, pp. 129-180.

Hatakka, A., Maijala, P., Steffen, K. & Hofrichter, M. 2001. Environmental biotechnology at Viikki Biocenter, University of Helsinki. Research on the biodegradation of organopollutants on the new processes for the pulp and paper industry. Kemia-Kemi 28(8)618-623. (in Finnish, abstract in English)

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Laboratory course manual

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Development of biotechnology education in the Faculty of Agriculture and Forestry, the founding of Helsinki Region Biotechnology Education Programme (HEBIOT), M.Sc. programme in biotechnology (MBIOT) and the joint education in molecular biosciences

The duties of the professor of environmental biotechnology include coordination and development of biotechnology education, related to bioproduction (production of biomasses). I was **from 1998 the chairperson of the Working Group of Biotechnology**, Faculty of Agriculture and Forestry. The Faculty had established in 1993 a specialization line in biotechnology for the students of the faculty. During the years 1993-2002 annually maximum 20 students were chosen to the specialization line. To develop biotechnology education in the faculty, the working group produced a memorandum dated 28.12.2000 "The status and development of biotechnology education at the Faculty of Agriculture and Forestry", 28 pp (in Finnish). The faculty decided in 2001 to establish a biotechnology educational programme, as suggested by the working group. Thus 12 new students started in the autumn 2002.

The biotechnology education was enlarged to form a **Helsinki Region Biotechnology Educational Programme (HEBIOT)** and a joint educational programme was created between the University of Helsinki, Helsinki University of Technology (HUT), and Helsinki School of Economics (HKKK) (presently the latter two are part of Aalto University). At the University of Helsinki the participants were the Faculty of Biosciences (coordinator), the Faculty of Agriculture and Forestry, which both took students (2004-2010), and some other faculties (Faculty of Pharmacy, Faculty of Science), and the research institutes (Institute of Biotechnology and the Neuroscience Centre) participated education. The HEBIOT programme obtained starting grant from the Ministry of Education for 2004-2006, 350.000 €/year. When the Faculty of Biosciences and Environment established an education program in molecular biosciences in 2011, the Faculty of Agriculture and Forestry started to take own students in biotechnology.

From 2015 B.Sc. education in molecular biosciences will be organized jointly by the faculties of Biosciences and Environment and Agriculture and Forestry. After obtaining the B.Sc. degree the students have option to continue to M.Sc. degree in biotechnology in one or the other faculty.

In 2006 the Ministry of Education granted 100.000 €/year for the years 2006-2008 to start an **International M.Sc. Programme in Biotechnology (MBIOT)**. MBIOT was established in July 14, 2005 by the statute 569/2005. Microbial and environmental biotechnology is one of the orientations, which offers education in English. MBIOT www-pages: <http://www.helsinki.fi/biotech/news/news.html>

The Faculty of Agriculture and Forestry established a **major topic biotechnology**, which started 01.08.2004. The number of new students is annually 15, and the maximum of 10 to M.Sc. programme (MBIOT) students.

In the Faculty of Agriculture and Forestry biotechnology is a joint major topic of three departments: Departments of Food and Environmental Sciences, Agricultural Sciences and Forest Sciences. I have been from 2004 the **responsible professor for the orientation microbial and environmental biotechnology**, which in one of the four orientations. The three other orientations are food biotechnology, animal biotechnology, and plant and forest biotechnology.

At present the **biotechnology education staff** of the Department of Food and Environmental Sciences, Division of Microbiology and Biotechnology, includes professor (Annele Hatakka), university lecture in biotechnology (Dr. Pauliina Lankinen) and university lecture in microbial biotechnology (Docent Dr. Kristiina Hildén).

By 2014 in **biotechnology (orientation microbial and environmental biotechnology) 5 doctoral dissertations** were accomplished (Lara Valentin Carrera, Anikó Varnái, Grit Kabiersch, Jenni Rahikainen, Outi Koivistoinen). The number of doctoral students is presently about 15.