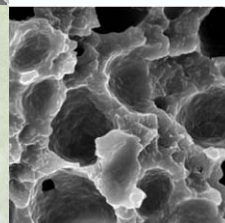
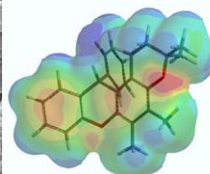
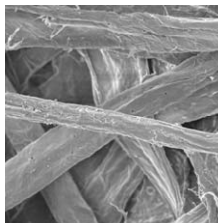
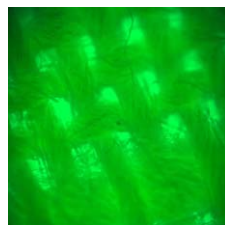




BOKU - University of Natural Resources  
and Applied Life Sciences

# Report 2007 – 2009 Department for Chemistry

analytical / bio  
**chemistry**  
organic / wood



## CONTENTS

Preface .....	3
Organigram .....	4
Personnel .....	5
Lectures and Practical Courses .....	9
Doctoral and Diploma Theses .....	11
Research Activities .....	24
Scientific Projects .....	31
Cooperation Partners .....	37
Publications .....	41
Research Activities Abroad .....	100
External Teaching Activities .....	101
Habilitations .....	102
University management .....	103
Awards .....	103
External Lectures and Seminar Talks .....	104
Press Reports .....	106
Invited Speakers .....	107
Scientific Events .....	109
Visiting Scientists .....	111
Other External Activities of the Members of the Department .....	112
Acknowledgements .....	113
Impressum .....	113

## Preface

Continuing the tradition of previous reports, the Department of Chemistry presents a compilation of its activities of the period 2007-2009, which covers the timeline of the 3-year contract commitment of the University of Natural Resources and Applied Life Sciences with the Ministry of Science and Research.

Within the past three years a further steep increase in student numbers of the bachelor study programme "Food- and Biotechnology" has been observed, leading to an all-time record of 303 first semester students in the introductory laboratory course in 2009/2010. The extremely heavy teaching load has been a major topic of discussion with the international review panel during the 2009 evaluation of the Department. Fortunately, since the opening of the new facilities at Muthgasse III, excellent conditions are now available for the biochemistry laboratory courses. The outstanding support by all members of the scientific, technical and administrative staff in managing the teaching duties of the Department is highly appreciated.

Major accomplishments have also been achieved in science and research with many members of the Department being active in international advisory boards and scientific journals. Despite the intensive teaching activities, SCI publications and patent applications have been substantially increased. Funding of ongoing and future research has now reached a level of 3 Mio € per year. The strategic concept of the Department with a focus on (bio)analytical expertise, glycosciences and renewable resources and materials has been fully supported by the members of the evaluation committee. Several highlights of the past years have to be mentioned here:

The successful implementation of the two Christian-Doppler-Laboratories "Advanced Chemistry and Analytics of Cellulose" and "Antibody Engineering" will secure a long-term research outcome and promote integration into major development areas of BOKU both at the University Research Centre Tulln (UFT) and the Vienna Institute of Biotechnology (VIBT). Furthermore, Christian Obinger and his team members have successfully applied for the novel FWF funded PhD school Biomolecular Technology of Proteins (BioToP), which will also have a longlasting effect in top-level education of PhD students at the VIBT. The "sweet side" of the Department has been on display during the successful organization of the recent 15th European Carbohydrate Symposium in 2009 which attracted 700 international participants. A similar event under the leadership of the Department – the 21st International Glycoconjugate Symposium - will take place at the University of Vienna in 2011.

Within the forthcoming period major activities are foreseen with the move of the groups of Thomas Rosenau and Thomas Prohaska to Tulln, where a dynamic development of "Green Chemistry" and exploitation of Renewable materials can be expected. Implementation of advanced analytical instrumentation at the Muthgasse campus will be of prime importance for all VIBT departments. The future development of bachelor and master curricula and PhD programmes will also be a major focus of our activities.

Finally, on behalf of the Department I thank all people and institutions of BOKU, the cooperating partners and funding institutions for continuous support and assistance.

Univ.Prof.Dipl.-Ing.Dr. Paul Kosma  
Head of Department

## Organigram

**H 770**  
**Department of Chemistry**

**Head:** Univ.Prof., Dipl.-Ing. Dr. Paul Kosma  
**Deputies:** O.Univ.Prof., Dipl.-Ing. Dr. h.c. Leopold März  
 Univ.Prof., Dipl.-Ing. Dr. Gerhard Stinger  
 Ao.Univ.Prof., Mag. Dr. Christian Obinger

**Department Office H770**

**Administrative Office:**  
 Luzia Kneisz  
 Sonja Ringhofer

**Teaching Assistants:**  
 DI/MMag. Dr. Michaela Zeiner (20h)  
 DI/Dr. Manfred Schwanninger (20h)

**Technicians (Student lab courses):**  
 Alexandra Hofinger  
 Andrea Kyselá (20h)  
 Veronika Slavik  
 Thomas Schmidt

**Division H 771**  
**Analytical Chemistry**

**Head:** Univ.Prof., Dipl.-Ing. Dr. Gerhard Stinger  
 Ao.Univ.Prof., Dipl.-Ing. Dr. Gundula Köllensperger  
 Ao.Univ.Prof., Dipl.-Ing. Dr. Thomas Prohaska  
 Priv.Doz., Dipl.-Ing. Dr. Stephan Hann  
 Hedda Drexler (Technician)

**Division H 772**  
**Biochemistry**

**Head:** O.Univ.Prof., Dipl.-Ing. Dr. Dr. h.c. Leopold März  
 Ao.Univ.Prof., Dipl.-Ing. Dr. Friedrich Altmann  
 Ao.Univ.Prof., Dipl.-Ing. Dr. Paul Furtmüller  
 Ao.Univ.Prof., Mag. Dr. Christian Obinger  
 Ao.Univ.Prof., Dipl.-Ing. Dr. Erika Staudacher  
 Ao.Univ.Prof., Vetr. Doz. Dphtl. Iain Wilson  
 Ing. Thomas Dalik (Technician)  
 Karin Hofbauer (Apprentice)

**Division H 773**  
**Organic Chemistry**

**Head:** Univ.Prof., Dipl.-Ing. Dr. Paul Kosma  
 Univ.Prof., Dipl.-Chem. Dr. Thomas Rosenau  
 Ass.Prof., Ing. Dipl.-Ing. Dr. Andreas Hofinger  
 Ao.Univ.Prof., Dipl.-Chem. Dr. Antje Potthast (20h)  
 Dipl.-Rest. Dr. Ute Henniges (20h)  
 Ao.Univ.Prof., Dipl.-Ing. Dr. Werner Praznik  
 Univ. Ass. Dr. Falk Lieber  
 Univ. Ass. Dr. Alla Zamyatina (30h)  
 Maria Hobel (Technician)  
 Dipl.-Ing. Dr. Sonja Schließer (20h, Technician)  
 Philip Lackner (Apprentice)

## Personnel

### Director of the Department

Univ.Prof. Dipl.-Ing. Dr. Paul Kosma

### Deputy Directors of the Department

Ao.Univ.Prof. Mag. Dr. Christian Obinger

O.Univ.Prof. Dipl.-Ing. Dr. Dr. h.c. Leopold März

Univ.Prof. Dipl.-Ing. Dr. Gerhard Stingeder

### Full professors

O.Univ.Prof. Dipl.-Ing. Dr. Dr.h.c. Leopold März

Univ.Prof. Dipl.-Ing. Dr. Paul Kosma

Univ.Prof. Dipl.-Chem. Dr. Thomas Rosenau

Univ.Prof. Dipl.-Ing. Dr. Gerhard Stingeder



L. März

### Associate professors

Ao.Univ.Prof. Dipl.-Ing. Dr. Friedrich Altmann

Ao.Univ.Prof. Dipl.-Ing. Dr. Paul G. Furtmüller

Priv.Do. Dipl.-Ing. Dr. Stephan Hann

Ao.Univ.Prof. Dipl.-Ing. Dr. Gunda Köllensperger

Ao.Univ.Prof. Mag. Dr. Christian Obinger

Ao.Univ.Prof. Dipl.-Chem. Dr. Antje Potthast, part time

Ao.Univ.Prof. Dipl.-Ing. Dr. Werner Praznik

Ao.Univ.Prof. Dipl.-Ing. Dr. Thomas Prohaska

Ao.Univ.Prof. Dipl.-Ing. Dr. Erika Staudacher

Ao.Univ.Prof. Dr. Iain B.H. Wilson

### Assistant professors

Univ.Ass. Dr. Martin Gutternigg, until 2007

Dipl.-Ing. Dr. Christine Haberhauer-Troyer

Univ.Ass. Dipl.-Rest. Dr. Ute Henniges, part time

Ass.Prof. Dipl.-Ing. Dr. Andreas Hofinger

Vert.Ass. Dipl.-Chem. Dr. Falk Liebner

Vert.Ass. Dr. Renate Löppert, part time, until 2007

Dipl.-Ing. Dr. Manfred Schwanninger, part time

Dipl.-Ing. Dr. Sonja Schiehser, part time

Univ.Ass. Dr. Alla Zamyatina, part time

**Secretary**

Luzia Kneisz

Sonja Ringhofer, since 2009

Martina Zoderer, until 2008

Christine Labes, until 2007, part time



Sonja Ringhofer

Luzia Kneisz

**Technical Staff**

Ing. Thomas Dalik

Hedda Drexler

Maria Hobel

Tanja Kriebernig

Alexandra Pederzoli, until 2009

Ing. Karin Polacsek

P. Lackner

A. Kysela

T. Schmidt

**General Laboratory Staff**

Alexandra Hofinger

Andrea Kysela, part time

Brigitte Kainz, until 2007

Thomas Schmidt

Veronika Slavik



V. Slavik

A. Hofinger

**Trainees**

Philip Lackner, since 2009

Karin Hofbauer

David Holzer, until 2008

Denise Kerner, until 2008

Tanja Kriebernig, until 2007

Andreas Pitschmann, until 2007

**External Lecturers**

Univ.Do. Dr. Bernhard Fischer

Ao.Univ.Prof. Dipl.-Ing. Dr. Karl Stich

Univ. Prof. Dr. Frank Unger

**(Project) Personnel**

Mag. Dr. Beatriz Abad Romero, until 2007  
Dipl.-Ing. Dr. Christian Adelwöhrer, until 2007  
M.Sc. Kyujin Ahn, since 2009  
Dr. Hassan Abdelzاهر Mohamed Amer  
Dipl.-Ing. (FH) Daniel Artner, since 2008  
Dipl.-Ing. Markus Auer, since 2008  
M.Sc. Srijib Banerjee  
Prof.em. Dr. Gerhard Banik, since 2009  
Dipl.-Ing. (FH) David Baum, since 2008  
M.Sc. Manuel Stefan Becker, since 2007  
Dipl.-Ing. Dr. Margit Bernroither, until 2008  
Dipl.-Ing. Markus Blaukopf  
Dipl.-Ing. Katharina Böck, until 2009  
Dipl.-Ing. Dr. Anna Bogolitsyna, since 2008  
Dipl.-Ing. Dr. Stefan Böhmendorfer  
M.Sc. Dr. Jayakumar Singh Bondili, until 2007  
Dr. Sergei Boulyga, until 2007  
Dipl.-Ing. Marion Brunner  
M.Sc. Krzysztof Buksa, until 2007  
Mag. Madeleine Dellmour  
Dipl.-Ing. Gerald Ebner, since 2008  
Dipl.-Ing. Thomas Falta  
Mag. Lisa Fischer  
Mag. Richard Fischl  
Dipl.-Ing. Dr. Patrick Galler, until 2008  
Mag. Josephine Grass, since 2008  
Dipl.-Ing. (FH) Wilhelm Herok, since 2008  
Mag. Ralph Hollaus, since 2009  
Dipl.-Ing. Alba Hykollari  
Dipl.-Ing. Johanna Irrgeher, since 2009  
Dipl.-Ing. Leonhard Jaitz  
Dipl.-Ing. Dr. Christa Jakopitsch, until 2007  
M.Sc. Dr. Chunsheng Jin  
Malgorzata Kapelko, until 2008  
Bakk. techn. Stefanie Kappel, since 2009  
M.Sc. Karl Michel Klinger, since 2009  
Dipl.-Ing. Elisabeth Kloser, until 2008  
Dipl.-Ing. Dr. Daniel Kolarich, until 2007  
Dipl.-Ing. Dr. Karin Krainz, until 2009  
Dr. Daris Kuakpetoon  
Dipl.-Ing. Elisabeth Lackinger

Dr. Renaud Léonard  
Tze Khong Liew, since 2009  
Dipl.-Ing. Dr. Gerd Margreiter, until 2007  
Dipl.-Ing. Dr. Hans Marx, until 2007  
Dipl.-Ing. Bernhard Müller  
Dipl.-Ing. Dr. Martina Opietnik  
Mag. Dr. Martin Pabst  
Dipl.-Ing. Dr. Katharina Paschinger  
M.Sc. Dr. Anjan Patel  
M.Sc. Dr. Ilabahan Patel  
Dipl.-Ing. Dr. Maximilian Popp, until 2008  
Dipl.-Ing. Georg Pour, since 2008  
Dipl.-Ing. Christoph Puls, since 2008  
Dr. Dubravko Rendić  
Dr. Carla Rodrigues  
M.Sc. Ariana Rugova, since 2009  
B.Sc. Dr. Maria del Carmen Ruiz Ruiz until 2008  
Dipl.-Holzwirt Dr. Axel Rußler, since 2009  
Dr. Keita Sakakibara, since 2009  
Dipl.-Ing. Birgit Schiller  
Dipl.-Ing. Christian Schimper, since 2009  
Mag. Michael Schrems, since 2008  
Johannes Schrenk, until 2009  
Mag. Georg Sixta, until 2008  
Dr. Christina Stadlbauer, since 2009  
Dipl.-Ing. Dr. Johannes Stadlmann  
Dipl.-Ing. Gerhard Stadlmayr, since 2009  
Dipl.-Ing. Johanna Maria Stampfer  
Dipl.-Ing. Dr. Christian Stanetty  
Dipl.-Ing. Bojan Stefanovic, since 2008  
Dipl.-Ing. Herwig Stepan, since 2008  
Dipl.-Ing. Dr. Siegfried Swoboda, until 2007  
Dr. Sharifah Nabihah Syed Jaafar, since 2009  
Dr. Midori Takasaki, since 2009  
Dipl.-Chem. Dr. Ivana Tot  
Dipl.-Ing. Michael Traxlmayr, since 2009  
Dipl.-Ing. Dr. Jutta Vlasits  
Dipl.-Ing. Dr. Kurt Wimmer, until 2008  
M.Sc. Shi Yan, since 2009  
M.Sc. Dr. Yuko Yoneda, until 2008  
Dr. Sarani Zakaria, since 2009  
Dr. Marcel Zamocky



M.Sc. Lubna Zeb

Dipl.-Ing. Dr. Martina Zederbauer, until 2007

Dr. Andreas Zitek, since 2009

## Lectures and Practical Courses

The Department of Chemistry takes part in the teaching of all major degree courses at the BOKU. The degree course in Food Science and Biotechnology (LBT) includes a broad education in chemistry. The other degree courses have mandatory lecture courses in General Chemistry and optional courses for specialisation.

### Lectures and courses 2009 (Bachelor- and Master- studies)

Lectures and Courses	Lecturers	Hours	Semester
<b>MANDATORY COURSES</b>			
770.100 General and Inorganic Chemistry for AW	C. Obinger	VO 2	WS
770.101 Organic Chemistry and Biochemistry	T. Rosenau / E. Staudacher	VO 3	SS
770.113 Bachelor Seminars	Dep. Personnel	SE 2	WS/SS
770.150 General Chemistry	B. Hinterstoisser	VO 3	WS
770.151 General Chemistry	B. Hinterstoisser	VO 3	SS
771.101 Introduction to General Chemistry	G. Stinger	VO 2	WS
771.102 Introductory Course to General Chemistry	Dep. Personnel	UE 2	WS
771.103 General and Physical Chemistry	G. Stinger / T. Prohaska / G. Köllensperger	VO 4	WS
771.104 Analytical Chemistry	G. Stinger / S. Hann	VO 4	SS
771.105 Practical Course in Classical Analytical Chemistry	Dep. Personnel	UE 6	SS
771.106 Practical Course in Instrumental Analytical and Physical Chemistry	Dep. Personnel	UE 7	WS
772.109 Fundamentals in Biochemistry	F. Altmann	VO 3	WS
772.112 Practical Course in Biochemistry I	Dep. Personnel	UE 5	WS/SS
772.113 Biochemistry and Microbial Physiology	C. Obinger / C. Schäffer	VO 4	SS
772.300 Biophysical Chemistry	I. Wilson		
772.301 Practical Course in Biochemistry II	Dep. Personnel	UE 5	WS/SS
772.312 Plant Biochemistry	K. Stich	VO 2	WS
773.107 Organic Chemistry for LBT	P. Kosma	VO 3	WS
773.108 Practical Course in Organic Chemistry	Dep. Personnel	UE 3	WS/SS
773.119 Practical Course in Basic Chemistry	Dep. Personnel	UE 4	SS
773.120 Organic Chemistry	A. Hofinger	VO 2	SS
773.125 Chemical Technology of Biobased Materials	A. Potthast	VO 2	SS
773.312 Chemistry and Technology of Sustainable Resources	A. Potthast / T. Rosenau	VO 2	SS
773.325 Chemistry and Technology of Polymers	F. Liebner / T. Rosenau	VO 2	SS
954.320 Cell & Molecular Biology	E. Staudacher / I. Wilson	VO 2	WS

**OPTIONAL COURSES**

770.102 Practical Course in Chemistry for Students of Agriculture	Dep. Personnel	UE	4	WS/SS
771.117 Environmental Analysis	G. Stingeder / A. Loibner / S. Hann			
	T. Prohaska / G. Köllensperger	VO	2	SS
771.118 Calculation in Chemistry I	T. Prohaska	VU	2	WS
771.119 Calculation in Chemistry II	T. Prohaska	VU	2	SS
771.314 Instrumental Analytic Chemistry for Master students	G. Stingeder/ T. Prohaska / G. Köllensperger	VU	3	SS
771.315 Practical Courses on Instrumental Analysis	G. Stingeder / T. Prohaska / G. Köllensperger	UE	4	SS
772.302 Protein Chemistry	B. Fischer	VO	2	WS
772.306 Proteomics	F. Altmann	VO	2	SS
772.307 Glycobiology	I. Wilson	VO	2	WS
772.308 Genetic Model Organisms in Biotechnology	I. Wilson	VU	3	WS
772.309 Biochemistry of Trace Elements	C. Obinger	VO	2	WS
772.310 Biomolecular spectroscopy	C. Obinger / M. Schwanninger	VO	2	SS
772.311 Kinetic of Biochemical Reactions	P. Furtmüller	VU	2	SS
772.316 Seminar in Biochemistry	E. Staudacher / L. März	SE	2	WS
772.317 Advanced Practical Course in Biochemistry	Dep. Personnel	UE	3	WS/SS
772.321 Biochemical and Biotechnological Methods	E. Staudacher / K. Vorauer-Uhl	VU	3	WS
773.310 Bioorganic Chemistry	P. Kosma	VO	2	SS
773.311 Introduction into Crystallography and NMR Spectroscopy of Proteins	P. Kosma	VO	2	SS
773.313 Modern Methods of Structural Analysis	P. Kosma / A. Potthast A. Hofinger	VU	3	SS
773.116 Renewable Materials and Green Chemistry	W. Praznik	VO	2	WS
773.318 Chemistry and Analysis of Nutritional Additives	W. Praznik	VO	2	SS

**ADDITIONAL COURSES**

771.004 Doctoral Seminar in Analytical Chemistry	Dep. Personnel	SE	2	WS/SS
771.031 Instrumental Methods in Analytical Chemistry	G. Stingeder	VO	2	SS
771.040 Seminar in Analytic Chemistry for Diploma and PhD Candidates	Dep. Personnel	SE	4	WS/SS
771.089 Metrology in Chemistry	T. Prohaska	VO	1	SS
771.090 Holistic Sciences	T. Prohaska	VO	1	SS
771.091 Advanced Analytical Techniques for Elemental Trace Analysis	T. Prohaska	VO	2	WS
771.304 Environmental Chemistry	Dep. Personnel	SE	3	SS
772.003 Seminar for Diploma and Doctoral Candidates	Dep. Personnel	SE	4	WS/SS

772.015 Doctoral Seminar in Biochemistry	Dep. Personnel	SE	2	WS/SS
772.049 Technology and its Environment	L. März	VO	2	SS
773.088 Practical Course in Chemistry for EE	A. Hofinger / B. Hinterstoisser	UE	4	SS
773.322 Chemistry for Civil Engineers	F. Liebner	VO	2	SS
773.572 Seminar for Diploma and Doctoral Candidates for Organic Chemistry	Dep. Personnel	SE	4	WS/SS
773.803 Doctoral Seminar in Bioorganic Chemistry	Dep. Personnel	SE	2	WS/SS

For more details look at <http://www.chemie.boku.ac.at/299.html>

List of abbreviations:  
 SE Seminar  
 VO Lecture Course  
 VU Lecture with Exercise  
 UE Practical Course

WS Winter Semester  
 SS Summer Semester  
 LBT Food Sciences and Biotechnology  
 EE Environmental Engineering  
 AW Agriculture Sciences

## Doctoral and Diploma Theses

### Division of Analytical Chemistry

Böck Katharina

Multidimensional separation schemes for ICP-MS analysis of metal-protein interaction

Diploma thesis 2007

Supervisor: Köllensperger Gunda, Hann Stephan

Böck Katharina

Speciation analysis in preclinical cancer research

Doctoral thesis since 2008

Supervisor: Köllensperger Gunda, Hann Stephan

Dell'mour Madleine

LC-MS analysis of root exudates

Doctoral thesis since 2008

Supervisor: Hann Stephan, Köllensperger Gunda

Brunner Marion

Determination of geographical origin of agricultural products via isotopic and elemental analyses by inductively coupled plasma mass spectrometry (ICP-MS) on the example of *Asparagus officinalis*

Diploma thesis 2007

Supervisor: Prohaska Thomas

Brunner Marion

Development of analytical technologies for the determination of the origin and authenticity of food and feed

Doctoral since thesis 2007

Supervisor: Prohaska Thomas

Falta Thomas

Analysis of toxic metals and assessment of their bioaccessibility from urban particulate matter by ICP-MS

Diploma thesis 2007

Supervisor: Hann Stephan, Stingeder Gerhard (joint with Andreas Limbeck, TU-Vienna)

Falta Thomas

Entwicklung von Speziierungsmethoden (LC-ICP-MS) für Verfahren zur Elimination prioritärer Metalle aus Abwässern

Doctoral thesis since 2007

Supervisor: Hann Stephan, Gunda Köllensperger

Feuerstein Juliet

Determination of  $^{90}\text{Sr}$  in soil samples using inductively coupled plasma mass spectrometry equipped with dynamic reaction cell (ICP-DRC-MS)

Diploma thesis 2007

Supervisor: Prohaska Thomas

Fischer Lisa

Entwicklung von Multielement- und Speziierungsmethoden (GC-ICP-MS) für Verfahren zur Elimination prioritärer Metalle aus Abwässern

Doctoral thesis since 2007

Supervisor: Hann Stephan, Gunda Köllensperger

Galler Patrick

Precise Sr Isotope Ratio Measurements by Multiple Collector-Inductively Coupled Plasma Mass Spectrometry

Doctoral thesis 2008

Supervisor: Prohaska Thomas

Horsky Monika

Determination of the provenance of historic wood samples by isotopic fingerprinting

Diploma thesis 2008

Supervisor: Prohaska Thomas

Irrgeher Johanna

Sr isotope ratio determination in human tissues

Diploma thesis 2008

Supervisor: Prohaska Thomas

Jaitz Leonhard

Entwicklung von LC-MS Methoden im Rahmen des BOKU-Netzwerks für Schad- und Naturstoffanalytik

Doctoral thesis since 2006

Supervisor: Hann Stephan, Gunda Köllensperger

Kappel Stefanie

Radioisotope fingerprinting of hot particles by LA-MC-ICP-MS

Diploma thesis: since October 2007

Supervisor: Thomas Prohaska

König Karin

Radioactive tracing in environmental samples by ICP-MS

Diploma thesis: since January 2007

Supervisor: Thomas Prohaska

Neubauer Stefan

Nucleotide analysis in yeast

Diploma thesis 2008

Supervisor: Köllensperger Gunda, Hann Stephan

Popp Maximilian

Bestimmung von Glyphosate und AMPA sowie Schwebstoff gebundenen Metallen in Oberflächenwässern

Doctoral thesis 2008

Supervisor: Köllensperger Gunda, Stephan Hann

Puls Christoph

Ultrapurenanalyse von Pt, Pd und Rh in Umweltproben

Doctoral thesis since 2008

Supervisor: Stephan Hann

Rampler Evelyn

Selenium speciation in yeast

Diploma thesis 2008

Supervisor: Köllensperger Gunda

Swoboda Siegfried

Characterization and authentication studies by isotopic and elemental pattern

Doctoral thesis 2008

Supervisor: Prohaska Thomas

Standler Alexander  
Platinum speciation in the environment  
Doctoral thesis 2007  
Supervisor: Hann Stephan

Schweigkofler Stephanie  
Sr und S isotope ratio in food provenance studies  
Diploma thesis 2008  
Supervisor: Prohaska Thomas

Sturm Monika  
Migration studies of fish by measurement of strontium isotope ratios and multi-elemental patterns in otoliths using LA-ICP-MS  
Diploma thesis 2008  
Supervisor: Prohaska Thomas

Van Dorpe Sylvie  
Elemental and isotopic mapping for food authenticity'  
Diploma thesis 2007  
Supervisor: Prohaska Thomas

Witzmann Bernhard  
Penetrationsverhalten und Eindringtiefe von Quecksilber aus Amalgamfüllungen in das benachbarte Gewebe  
Diploma thesis 2007  
Supervisor: Prohaska Thomas

Zeb Lubna  
Investigation of biomonitoring of heavy metals in human tissues  
Doctoral thesis since 2008  
Supervisor: Prohaska Thomas

### **Division of Biochemistry / Glycobiology**

Ahmed Aufy  
Purification and characterization of a galactosidase from snails  
Doctoral thesis since 2009  
Supervisor: Staudacher Erika

Chunsheng Jin  
The allergenicity of plant and insect N-glycan in mammals  
Doctoral thesis 2007  
Supervisor: Altmann Friedrich

Gutternigg Martin  
Hexosaminidase from *Caenorhabditis elegans*, man and mouse  
Doctoral thesis 2007  
Supervisor: Wilson Iain B. H.

Hykollari Alba  
Glycosylation in *Dictyostelium discoideum*  
Doctoral thesis since 2007  
Supervisor: Wilson Iain B. H.

Kurz Simone  
Galactofucose epitopes in invertebrates and protozoa  
Diploma thesis 2009  
Supervisor: Wilson Iain B. H.

Kretschmer-Lubich Dorothea  
Hexosaminidases of *Caenorhabditis*  
Diploma thesis 2008  
Supervisor: Wilson Iain B. H.

Pabst Martin  
Analysis of oligosaccharides by LC-MS  
Doctoral thesis 2009  
Supervisor: Altmann Friedrich

Paschinger Katharina  
Glycosylation in *Caenorhabditis elegans*  
Doctoral thesis 2008  
Supervisor: Wilson Iain B. H.

Riegler Teresa  
Preparation of substrates for snail enzymes  
Diploma thesis since 2009  
Supervisor: Staudacher Erika

Rosenberger Andrea  
Xylose metabolism in *Trichomonas vaginalis*  
Diploma thesis 2009  
Supervisor: Wilson Iain B. H.

Rudolf Judith

N-Glycosylierungsmuster von Gastropoden

Diploma thesis 2007

Supervisor: Staudacher Erika, Gutternigg Martin

Schiller Birgit

Glycosylation of *Dictyostelium discoideum*

Diploma thesis 2007

Supervisor: Wilson Iain B. H.

Schiller Birgit

Glycosylation in *Acanthamoeba*

Doctoral thesis since 2008

Supervisor: Wilson Iain B. H.

Singh Bondili Jayakumar

The plant N-glycosylation pathway

Doctoral thesis 2007

Supervisor: Altmann Friedrich

Sobczak Lukas

Fucosyltransferasen in *Caenorhabditis elegans*

Diploma thesis 2007

Supervisor: Wilson Iain B. H.

Stadlmann Johannes

Glycomodification of recombinant glycoproteins

Doctoral thesis 2009

Supervisor: Altmann Friedrich

Stemmer Ute

Fucosylation in *Caenorhabditis elegans*

Diploma thesis 2007

Supervisor: Wilson Iain B. H.

Stepan Herwig

O-Glycan structures of gastropods

Doctoral thesis since 2008

Supervisor: Staudacher Erika



Stowasser Karin

Fucosyltransferasen in Schnecken

Diploma thesis since 2006

Supervisor: Staudacher Erika, Gutternigg Martin

Vesely Cornelia

Regulation of B-type subunits of protein phosphatase 2A (PP2A) by reversible phosphorylation in *Saccharomyces cerevisiae*

Diploma thesis 2008

Supervisor: Staudacher Erika

Wang Hui-jie

Glycosyltransferases from *Caenorhabditis* and *Drosophila*

Diploma thesis since 2009

Supervisor: Wilson Iain B. H.

Wohlschlager Therese

Exploring the role of sialic acids in *Aspergillus fumigatus* conidia binding to extracellular matrix proteins

Diploma thesis 2007

Supervisor: Altmann Friedrich

Yan Shi

Glycosyltransferases and glycosidases from invertebrates

Doctoral thesis since 2009

Supervisor: Wilson Iain B. H.

### **Division of Biochemistry / Metalloprotein Research Group**

Auer Markus

Mechanismus der H<sub>2</sub>O<sub>2</sub>-Oxidation in Catalase-Peroxidase

Diploma thesis 2007

Supervisor: Obinger Christian

Auer Markus

Cloning and characterization of human eosinophil peroxidase in HEK cells

Doctoral thesis since 2009

Supervisor: Obinger Christian, Furtmüller Paul

Banerjee Srijib

Dynamics of structure and function of metalloproteins

Doctoral thesis since 2006

Supervisor: Obinger Christian, Furtmüller Paul

Bernroither Margit

Respiration in cyanobacteria: the role of cytochrome  $c_b$ , cytochrome  $c_M$  and plastocyanin

Doctoral thesis 2009

Supervisor: Obinger Christian, Furtmüller Paul

Feichtinger Markus

Cytochrom  $c_6$  in *Synechocystis* PCC 6803

Diploma thesis 2008

Supervisor: Obinger Christian

Ganster Bernadette

Glycosylation in recombinant myeloperoxidase

Diploma thesis since 2006

Supervisor: Obinger Christian, Furtmüller Paul

Gusenbauer Doris

Elektronentransportkomponenten der Atmungskette in *Nostoc* PCC 7120

Diploma thesis 2008

Supervisor: Obinger Christian

Gruber Clemens

Expression, purification and characterization of the myeloperoxidase variants R333A and R333K

Diploma thesis since 2009

Supervisor: Obinger Christian, Furtmüller Paul

Hasenhindl Christoph

Stabilising mutations in the antibody CH2 domain

Diploma thesis since 2009

Supervisor: Obinger Christian

Lucini Chantal

$Cu_a$  domain of terminal cytochrom  $c$  oxidase in *Nostoc* PCC7120

Diploma thesis 2008

Supervisor: Obinger Christian

Magreiter Gerd

Monitoring of inclusion body formation by FT-IR spectroscopy

Doctoral thesis 2008

Supervisor: Obinger Christian, Bayer Karl

Paier Martin

Production and Purification of cytochrome  $a_5$

Diploma thesis 2009

Supervisor: Obinger Christian

Schachinger Judith

Copper A from *Nostoc* PCC 7120

Diploma thesis 2008

Supervisor: Obinger Christian

Schwanninger Manfred

Lignin chemistry and wood anatomy of spruce (*Picea abies* (L.) KARST) as wood quality factors

Doctoral thesis 2007

Supervisor: Kosma Paul

Stampler Johanna

Cloning and characterization of human Lactoperoxidase in HEK-cells

Doctoral thesis since 2007

Supervisor: Obinger Christian, Furtmüller Paul

Soudi Monika

Expression, purification and characterization of the myeloperoxidase variant Asn421Asp

Diploma thesis since 2008

Supervisor: Obinger Christian, Furtmüller Paul

Traxlmayr Michael

Stability enhancement and affinity maturation of IgG1-Fc

Doctoral thesis since 2009

Supervisor: Obinger Christian

Vlasits Jutta

Functional and mechanistic studies on catalase-peroxidase

Doctoral thesis 2009

Supervisor: Obinger Christian, Furtmüller Paul

### **Division of Organic Chemistry**

Abad Romero Beatriz

Synthesis and derivatization of xylooligomers

Doctoral thesis 2007

Supervisor: Kosma Paul

Artner Daniel

Synthese von Lipoid A Mimetika

Doctoral thesis since 2008

Supervisor: Zamyatina Alla, Kosma Paul

Blaukopf Markus

Aminoarabinose-Epitope

Doctoral thesis since 2006

Supervisor: Kosma Paul

Baum David

Synthese von Lipoid A Mimetika

Doctoral thesis since 2008

Supervisor: Zamyatina Alla, Kosma Paul

Baum David

Synthese von Resveratrol-Derivaten

Diploma thesis 2008

Supervisor: Kosma Paul

del Ruiz-Ruiz Maria Carmen

Neue glycosylierte Triterpene

Doctoral thesis 2008

Supervisor: Kosma Paul

Doppelreiter Alexander

Synthese von Derivaten der Glycyrrhetinsäure

Diploma thesis since 2009

Supervisor: Kosma Paul, Stanetty Christian

Gadinger Alexander

Synthese von Heptosedisacchariden

Diploma thesis since 2009

Supervisor: Kosma Paul

Güzlek Hacer

Synthese von Heptose 7-Phosphat

Diploma thesis 2007

Supervisor: Kosma Paul

Herok Wilhelm  
Synthese von Xylanfragmenten  
Doctoral thesis since 2007  
Supervisor: Kosma Paul

Herok Wilhelm  
Alternative Strategien zur Synthese von Dutasterid  
Diploma thesis 2008  
Supervisor: Kosma Paul

Hollaus Ralph  
Synthese von Lipoid A Mimetika  
Doctoral thesis since 2008  
Supervisor: Zamyatina Alla, Kosma Paul

Kocsis Laura  
Influence of harvest time on yield and profile of carbohydrates in different varieties of Jerusalem artichoke (*Helianthus tuberosus* L.) for the utilisation in functional food  
Doctoral thesis 2007  
Supervisor: Praznik Werner

Koller Iris  
Synthese von Derivaten der Glycyrrhetinsäure  
Diploma thesis 2009  
Supervisor: Stanetty Christian, Kosma Paul

Müller Bernhard  
Aminoarabinosephosphat-Epitope  
Doctoral thesis since 2007  
Supervisor: Kosma Paul

Sixta Georg  
Synthesis and modification of the chlamydial Kdo epitope  
Doctoral thesis since 2004  
Supervisor: Kosma Paul

Stanetty Christian  
Neue glycosylierte Triterpene  
Doctoral thesis 2010  
Supervisor: Kosma Paul

Wimmer Kurt  
Synthese von Chlamydien-spezifischen Kdo-Antigenen  
Doctoral thesis 2009  
Supervisor: Kosma Paul

### **Division of Wood, Pulp and Fibre Chemistry**

Böhmdorfer Stefan  
Spiropolymerization of tocopherol derivatives  
Doctoral thesis 2009  
Supervisor: Rosenau Thomas

Dunareanu Ramona  
Preparation of cellulosic aerogels  
Diploma thesis since 2008  
Supervisor: Falk Liebner, Rosenau Thomas

Ebner Gerald  
Surface modification of cellulosic tissue with advanced slow-release reagents  
Doctoral thesis since 2008  
Supervisor: Antje Potthast, Rosenau Thomas

Ebner Gerald  
Fluorescence labeling of hexenuronic acids in cellulose  
Diploma thesis 2008  
Supervisor: Rosenau Thomas

Haimer Emmerich  
Supercritical CO<sub>2</sub> in processing of lignocellulosics  
Doctoral thesis since 2006  
Supervisor: Martin Wendland (Dept. f. Materialwiss.), Liebner Falk, Rosenau Thomas

Henniges Ute  
Cellulose analytics by fluorescence labelling and GPC  
Doctoral thesis 2008  
Supervisor: Potthast Antje

Kloser Elisabeth  
Synthesis of novel tocopherol derivatives  
Doctoral thesis 2008  
Supervisor: Rosenau Thomas

Krainz Karin

Residual chromophores in bleached pulps

Doctoral thesis 2009

Supervisor: Rosenau Thomas, Antje Potthast

Klinger Karl Michael

Oxidative ammonolysis of lignins in modern biorefinery scenarios

Doctoral thesis since 2009

Supervisor: Rosenau Thomas, Antje Potthast

Lackinger, Elisabeth

Novel substitutes for ASA paper sizing agents based on natural vegetable oils

Doctoral thesis since 2008

Supervisor: Rosenau Thomas, Antje Potthast

Opietnik Martina

Synthesis of heterocyclic receptor agonists

Doctoral thesis 2009

Supervisor: Rosenau Thomas

Patel Anjan

Oxidation chemistry of non-alpha tocopherols

Doctoral thesis 2007

Supervisor: Rosenau Thomas

Patel Ilababen

Chemical and enzymatic modification of celluloses

Doctoral thesis since 2006

Supervisor: Potthast Antje, Rosenau Thomas

Pour Georg

Synthesis and CO<sub>2</sub>-binding of ammoxidized lignins

Doctoral thesis since 2008

Supervisor: Liebner Falk, Rosenau Thomas

Ragab Tamer

Ammoxidation of lignin model compounds

Diploma thesis 2008

Supervisor: Liebner Falk, Rosenau Thomas

Schimper Christian

Effect of alkali treatment on *Trichoderma* cellulase treatments of cellulose fibers.

Diploma thesis 2008

Supervisor: Rosenau Thomas, Antje Potthast

Schrems Michael

Advanced separation processes in lignocellulosic biorefinery scenarios

Doctoral thesis since 2008

Supervisor: Rosenau Thomas, Antje Potthast

Stefanovic Bojan

Modern lignocellulosic biorefinery scenarios

Doctoral thesis since 2008

Supervisor: Rosenau Thomas, Antje Potthast

Syed Jaafar Sharifah Nabihah

Palm empty fruit bunch fibers (EFB) as raw material for biorefineries

Doctoral thesis since 2009

Supervisor: Rosenau Thomas, Antje Potthast

Tot Ivana

Fluorescence labelling of hexenuronic acid residues in celluloses

Doctoral thesis 2009

Supervisor: Potthast Antje

Yuko Yoneda

Cellodextrins: synthesis and direct dissolution mechanism

Doctoral thesis 2007

Supervisor: Rosenau Thomas, Kosma Paul

## **Research Activities**

### **Division of Analytical Chemistry**

The core research areas of the division are related to isotopic, elemental, species and molecular analysis with the focus on inorganic and organic mass spectrometry. The topics are segmented in three research groups which are linked via the central subject of instrumental method development. The aim is to develop and establish analytical methods in the core subjects of the division.

Group "VIRIS - Analytical Ecogeochemistry": The research group of Thomas Prohaska has a core competence in elemental and isotopic analysis using mass spectrometry and related techniques. The major research areas



cover the fields of (i) authentication and quality control of food and feed (ii) animal and human migration studies (iii) environmental (bio)monitoring and (iv) forensic analysis and archaeometry.



Group “Analysis of Natural and Hazardous Compounds”: The research group of Stephan Hann has a core competence in the area of separation science and mass spectrometry for analysis of biological, technological and environmental matrices covering (i) ultra trace analysis of ground- and surface waters, (ii) analysis of platinum group elements, (iii) metabolomics in the context of biotechnology and soil- and rhizosphere research, (v) ultra trace analysis of biotechnological samples and food, (vi) industrial applications.

Group “Bioanalysis”: The research group of G. Köllensperger has a major research focus in the field of elemental speciation analysis and the combined use of elemental and molecular mass spectrometry in biology and biomedicine. The group is involved in the development of elemental proteomic work flows and their integration in preclinical studies of experimental drugs, strategies for in vivo quantification of biomolecules and the application of ICP-MS approaches in the biotechnological production of metalloproteins/proteins.

### **Division of Biochemistry / Glycobiology**

Glycobiology is the science examining the “sweet” side of proteins; the vast majority of proteins in the bloodstream and on cell surfaces are glycoproteins – which, other than amino acids, contain sugars known as glycans. The three (or already almost four) principle investigators lead rather independent groups with complementary approaches and goals.

Iain Wilson is particularly interested in the biosynthesis and developmental roles of protein glycosylation in various model organisms, especially *Drosophila*, *Dictyostelium* and *Caenorhabditis*, as well as with various parasitic worms and protists. In order to uncover the “secrets” of these not so primitive organisms, knock-out strategies are utilised in order to study the effect of gene deletions on glycans biosynthesis. Seeking parallels

between model and parasitic organisms, as well as the determining the unique nature of parasite glycomes constitute a major part of the work. The interactions of lectins (carbohydrate-binding proteins) with glycans are also of interest, as exemplified by a recent collaboration with ETH Zürich on a worm-killing fungal galectin. Reflecting the growth of this research area, his group moved into new premises (Muthgasse III) in 2009.



Friedrich Altmann's group engages in the instrument-driven analysis of proteins, especially those with covalently-attached sugar chains, with the framework of many co-operations with biotechnological research groups. In this context, the electrospray mass spectrometer acquired some years ago opened up new possibilities in terms of glycan analysis. The determination of the glycosylation profile of recombinant glycoproteins produced in a range of expression systems is a major focus; emphasis is laid on the enzymatic synthesis of reference oligosaccharides, whereas the biologically-relevant effects of protein-linked sugars continue to be of interest – for instance in the realm of in vitro allergy diagnosis. Within this group, Renaud Léonard, a postdoc on his way to independence, examines aspects of the biosynthesis of plant cell walls using *Arabidopsis* as a model.

Erika Staudacher luckily finds, besides her engagement in the university senate, still sufficient time for revealing the ways in which molluscs make their glycoproteins. Two of the relevant snail species are grown in the lab and this ensures a continuous supply of material for glycomic and enzymatic analyses.

### **Division of Biochemistry / Metalloprotein Research Group**

The main objective of research is to understand the structural basis of **metalloprotein functions**, with particular interest in iron and copper-containing enzymes. The proteins are purified from various organisms, the corresponding genes identified, cloned, sequenced, and the proteins finally heterologously overexpressed (*Escherichia coli*, *Pichia pastoris*, Chinese hamster ovary-, HEK-cell lines). Exchange of amino acids by either site-directed or random mutagenesis in combination with biophysical methods (electron paramagnetic resonance spectroscopy, resonance Raman spectroscopy, UV-Vis- and fluorescence spectroscopy, circular dichroism spectroscopy, differential scanning calorimetry), transient- and steady-state kinetic investigations (multi-mixing stopped-flow spectroscopy) and X-ray crystallography allow elucidation of structure and function including detailed characterization of the corresponding redox intermediates, which are relevant in catalysis. In addition we ask for the role of post-translational modifications in both the prosthetic groups and the protein matrix in catalysis of oxidoreductases.

In a recently started Christian Doppler Laboratory for Antibody Engineering new generations of **engineered monoclonal antibodies** with improved properties are being developed. We aim to design stable antibodies and antibody fragments of extended lifespan and additional binding sites by engineering both the protein scaffold and the non-CDR loops of constant or variable domains.

The group is funded by several FWF-projects and coordinates the Christian Doppler Laboratory for Antibody Engineering (2009-2016) and the Doctoral Program-plus Biomolecular Technology of Proteins – BioToP (2010-2022).

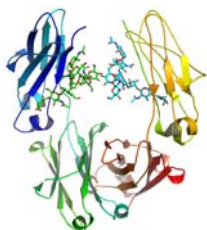


Ongoing projects:

(I) Structure function relationships of bifunctional **catalase-peroxidases** (KatG). The group designed and produced more than 50 recombinant variants of prokaryotic and eukaryotic KatGs and was successful in the identification of essential amino acids involved in both the  $H_2O_2$  oxidation and reduction reaction. X-ray crystallography, mass spectrometry and high-field electron paramagnetic resonance spectroscopy revealed new peculiar post-translational modifications and the formation of tryptophanyl and tyrosyl radicals in the reaction of the enzyme with peroxides. Their contribution to the electronic structure of the redox intermediates as well as their role in one- and two-electron oxidation reactions catalyzed by KatG are investigated. In addition we search for the actual binding site(s) of the (unknown) endogenous peroxidase substrate(s).

(II) Structure-function relationships of **human peroxidases** are investigated in order to understand their role in immunology and inflammation. Myeloperoxidase (MPO) and eosinophil peroxidase (EPO) are isolated from leukocytes (neutrophils and eosinophils, respectively), whereas lactoperoxidase (LPO) is secreted from glands. Recombinant wild-type and mutants are heterologously overexpressed in CHO- and HEK cell lines. The main objective is to understand the mechanism of substrate oxidation (two-electron pathway *versus* one-electron pathway) and the structural basis of the different physical and chemical features of the redox intermediates. The role of the heme to protein linkages on redox chemistry and catalysis is investigated. Furthermore, both MPO and EPO as potential pharmacological targets are tested in order to develop inhibitors since both enzymes play an essential role in host defense but also contribute to many (inflammatory) pathologies. Therefore, it is obviously desirable to design drugs that will dampen inflammation without precipitating infectious diseases. In an additional project we look for the phylogenetic origin of this protein superfamily and homologous proteins at prokaryotic level.

(III) Within Module 1 of the Christian Doppler Laboratory the **constant domain of human IgG1** will be engineered by an integrated set of approaches (rational mutagenesis, random mutagenesis, directed evolution, protein library design, yeast display, cell sorting etc.) to enhance their stability and folding. Particular emphasis will be laid on the so-called Fcab (**Fc** with **antigen binding** properties) and the Fab format. The biochemical and biophysical properties of the engineered domains will be characterized and they will be used as scaffolds for new libraries in which structural loops are randomized, aimed at the selection of specifically binding domains from such libraries. Domains with improved stability are expected to outperform the original domains in aspects such as structural tolerance to the mutations in the structural loops as well as expression characteristics.



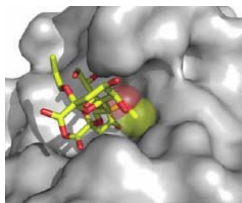
Fc domain from IgG1

(IV) Recently, based on the peroxidase domain of mammalian peroxidases, we defined the peroxidase-cyclooxygenase superfamily and its subdivision in seven subfamilies. The second subfamily is represented by **peroxidasins** found in invertebrates and vertebrates including mammals. The fully uncharacterized multidomain proteins contain a signal peptide, several leucine-rich regions, followed by immunoglobulin domains, a linking region, the peroxidase domain, and a carboxy terminal van Willebrand type C domain most probably for protein-protein interaction. Analysis of genome databases showed the existence of two human peroxidasin genes. So far neither structural nor detailed biochemical and biophysical data of human peroxidasins are available, yet these enzymes might play a role in defense against microbes that enter the vasculature, and also in inflammatory diseases. Within the PhD program BioToP structure-function analysis of both human enzymes will be performed.

## Division of Organic Chemistry

The main research topic of the group is based on natural product chemistry focused on the role of carbohydrates in eliciting or modulating the adaptive as well as innate immune responses.

Research interests are related to the immunochemistry and structural biology of complex carbohydrates from bacteria, viruses, parasites and plants. Key expertise has been developed in the chemical synthesis of oligosaccharides, glycopospholipids, nucleotide-activated sugars and neoglycoconjugates. The chemically synthesized ligands and neoglycoconjugates are being used in the clinical diagnosis of chlamydial and parasitic (*Toxocara canis*) infections. Furthermore, the compounds are employed for a detailed analysis of carbohydrate-antibody interactions at collaborating institutes using serology, molecular modelling, X-ray crystallography and surface plasmon resonance spectroscopy. Thus, the small number of known crystal structures of antibody-carbohydrate complexes has now been considerably expanded with a set of Kdo-specific monoclonal antibodies, synthetic oligosaccharide and Kdo analogues providing a better understanding on how the adaptive immune system reacts to common bacterial sugars (Figure).



Binding-site of a chlamydia-specific antibody complexed to a synthetic ligand

- The chemical synthesis of Inner core and Lipid A structures of **bacterial lipopolysaccharides** and their conversion into artificial antigens has been accomplished to investigate antigenic properties of the core region as well as the immunobiology of synthetic Lipid A ligands from *Chlamydia*, *Francisella*, *Burkholderia* and *Pseudomonas* species. Synthetic endotoxin mimetics have been designed as potential future therapeutics against Gram-negative sepsis
- Evaluation of the binding modes of Kdo antigens within the binding sites of germline derived antibodies (Cooperation with H. Brade, S. Evans)
- Synthesis and biosynthesis of **nucleotide-activated bacterial heptoses** such as ADP and GDP heptose.
- Lectin recognition involving heptosyl units of bacterial LPS (Cooperation with E. Crouch, J. Head, A. Imberty) by human lung surfactant protein and Burkholderia antigens
- Modulation of the immune response by cell-surface sugars from parasites. Synthetic neoglycoconjugates to be used in the clinical diagnosis of parasitic *Toxocara canis* infections
- The **Antiviral Spot of Excellence** project (<http://www.aspex-vienna.at>) jointly with TU Vienna and Onepharm is dedicated to chemical modification of the plant-derived drug glycyrrhizin and other triterpenes to be used for the development of inhibitors of steroid dehydrogenases as well as potential drugs against viral infections (SARS and Influenza)
- Synthesis of model compounds related to cellulose and wood derived hemicelluloses. Exploitation of carbohydrates as organic raw materials (WOOD COMET, EPNOE)



Competence in **NMR-spectroscopy** is an indispensable tool for structural assignments and structure elucidation for native glycans and biosynthetic intermediates. A number of structures of S-Layer glycoprotein

glycans and secondary cell wall polymers isolated at the Centre of Nanobiotechnology could be elucidated by NMR techniques. In addition, biosynthetic pathways for the generation of nucleotide-activated sugars such as GDP-Fucose, dTDP-Rhamnose, dTDP-D-FucNAc and dTDP-QuiNAc, respectively, were characterized by NMR analysis of the intermediates. A new HRMAS-probe and a 400 MHz instrument has been installed in 2007 opening new fields of application especially for fibres, organic soil components, polymers and food. A 600 MHz instruments will be installed in 2010.

### Division of Wood, Pulp and Fibre Chemistry

The chair for "Wood Pulp and Fiber chemistry" at the Department of Chemistry is concerned with the chemistry of renewable resources ("Chemistry NAWAROS"). The research focuses on the following topics:

- Cellulose chemistry (structural chemistry, dissolution of cellulose and cellulose solvents, cellulosic fibers, bleaching chemistry) and polysaccharide chemistry
- Biopolymer analytics with an emphasis on cellulose and polysaccharide analytics (molecular weight distributions, profiles of functional groups, substituent distributions, oxidative modifications, chromophore analytics)
- Chemistry and development of phenolic antioxidants (structure-property relationships, novel tocopherol derivatives, multifunctional stabilizers, phenolic extractives)
- Chemistry of biomaterials on basis of renewable resources (cellulosic aerogels, "intelligent fibers", "intelligent textiles", conductive / photoelectric cellulose derivatives, phenolic resin substitutes)
- Chemistry of conservation and restoration of historic and valuable cellulosic objects (aging chemistry and conservation chemistry)
- Lignocellulosic biorefinery scenarios (exploitation of renewable resources)
- Lignin, natural and artificial humic substances (N-lignins), lignite, hydrogels
- "Green Chemistry" (sustainable and environmentally compatible chemical reactions, solvent less, energy-saving and atom-economical reactions, microwave-supported syntheses, new reaction media)



The methods employed encompass the entire spectrum of organic synthesis with accompanying analytics (cellulosic and phenolic model compounds, cellulose derivatives, isotopic labeling, heterocyclic chemistry), structural aspects (solid-state, gel and solution NMR, EPR, crystal structure analysis) as well as specialized analytical techniques (gel permeation chromatography with multiple detection, hyphenated capillary electrophoresis).

While many scientific activities cover fundamental aspects, also a broad spectrum of applied research is covered, especially in the framework of the Christian-Doppler-Laboratory "Advanced cellulose chemistry and analytics" with its industrial partners.

State-of-the-art laboratories and equipment are placed at the disposal of a very active work group with members from all over the world, engaged in many national and international collaborations. Additionally, we host numerous visiting scientists from Europe and worldwide.

As services, several aspects concerning the chemistry, processing and application and advanced analytics of renewable resources and antioxidant chemistry are offered.

## Scientific Projects

### Division of Analytical Chemistry

Vienna Isotope Research and Survey (VIRIS)

Start: 01 03 2005

End: 31 02 2011

Financing: FWF, Austrian Science Fund (START Project)

Elimination of priority metals from communal waste water

Start: 01 10 2006

End: 31 12 2009

Financing: BM Kommunalcredit Austria AG Wien Austria

Analysis of metals in the aquatic phase and in suspended matter of surface water by inductively coupled plasma mass spectrometry (ICP-MS)

Start: 30 08 2005

End: 30 09 2007

Financing: BM für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft Wien, Austria

Mobilisation and uptake of anthropogenic Pt, Pd and Rh emissions in the environment

Start: 01 08 2008

End: 30 09 2011

Financing: FWF, Austrian Science Fund

**BOKU Netzwerk zur Schad- und Naturstoffanalytik**

Start: 01 08 2005  
End: 31 12 2010  
Financing: BM für Bildung, Wissenschaft und Kultur, Wien, Austria

**Speciation analysis in preclinical drug development**

Start: 01 01 2008  
End: 31 12 2010  
Financing: FWF, Austrian Science Fund

**Characterization of yeast cell wall**

Start: 01 01 2008  
End: 31 12 2008  
Financing: Biomin

**Nucleotide analytic of yeast cell wall**

Start: 01 09 2008  
End: 31 07 2009  
Financing: Biomin

**Assessing the potential of isotopes and elements in different hard parts of freshwater fish species to determine origin and migratory patterns using laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS)**

Start: 01 10 2009  
End: 31 03 2012  
Financing: FWF, Austrian Science Fund

**Elemental labeling of peptides**

Start: 01 10 2009  
End: 30 09 2012  
Financing: FWF, Austrian Science Fund

**Effects of different soil management systems on carbon sequestration, CO<sub>2</sub> emissions and behaviour of glyphosate and AMPA in soils.**

Start: 01 09 2007  
End: 31 08 2010  
Financing: BM für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft Wien, Austria

**Determination of background concentrations of priority elements (Water Framework Directive 2000/60/EG) of selected Austrian rivers via ICP-SFMS**

Start: 16 01 2009  
End: 30 06 2010  
Financing: BM für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft Wien, Austria



**Division of Biochemistry / Glycobiology**

Recombinant pharmaceuticals from plants for human health

Start: 01 02 2004

End: 31 12 2009

Financing: European Commission, Brussels, European Union

Modulation of the N-glycosylation pathway in plants for the production of pharmaceutically relevant glycoproteins

Start: 01 02 2004

End: 31 01 2008

Financing: WWTF

Glycosylation of *Caenorhabditis elegans* II

Start: 01 10 2005

End: 30 09 2007

Financing: FWF, Austrian Science Fund

Glycogenomics of *Dictyostelium discoideum*

Start: 01 04 2007

End: 31 19 2010

Financing: FWF, Austrian Science Fund

Arabinosylated allergens in weed pollen

Start: 01 08 2006

End: 31 07 2009

Financing: FWF, Austrian Science Fund

Re-engineering Glycosylation in Insect cells

Start: 01 04 2007

End: 31 10 2010

Financing: FWF, Austrian Science Fund

Comparative Glycomics of Selected Nematodes

Start: 01 09 2009

End: 31 08 2012

Financing: FWF, Austrian Science Fund

Development of Carbohydrate Array Technologies to Systematically Explore the Functional role of Glycans in Healthy and Diseased States

Start: 01 09 2008

End: 31 08 2012

Financing: Commission of the European Communities, Rue de la Loi, Brussels, European Union

Fucosylation and defucosylation in *Arabidopsis thaliana*

Start: 01 09 2007

End: 31 08 2010

Financing: FWF, Austrian Science Fund

Glycosylation of *Acanthamoeba castellanii*

Start: 01 04 2008

End: 31 03 2011

Financing: FWF, Austrian Science Fund

O-glycan structures of gastropods

Start: 01 03 2008

End: 28 02 2011

Financing: FWF, Austrian Science Fund

**Division of Biochemistry / Metalloprotein Research Group**

Proteinreinigung und Strukturanalysen

Start: 01 08 1998

End: 31 12 2012

Financing: Planta Natural Products Vertriebs GmbH, Vienna, Austria

Structure-function relationships in catalase-peroxidases

Start: 01 01 2006

End: 31 12 2008

Financing: FWF, Austrian Science Fund

Spectroscopic techniques for bioprocess optimization

Start: 01 11 2005

End: 31 10 2008

Financing: FWF, Austrian Science Fund

Respiration in cyanobacteria: the role of cytochrome  $c_b$ , cytochrome  $c_M$  and plastocyanin

Start: 01 02 2005

End: 31 01 2008

Financing: FWF, Austrian Science Fund

## Catalase-peroxidase from phytopathogenic fungi

Start: 17 09 2008  
End: 31 08 2011  
Financing: FWF, Austrian Science Fund

## Christian Doppler Laboratory for Antibody Engineering - Modul 1

Start: 01 03 2009  
End: 28 02 2015  
Financing: Christian Doppler Forschungsgesellschaft (CDG)

## Recombinant human lactoperoxidase and eosinophil peroxidase

Start: 01 03 2008  
End: 28 02 2011  
Financing: FWF, Austrian Science Fund

**Division of Organic Chemistry**

## Antiviral Spot of Excellence (ASPEX)

Start: 01 03 2006  
End: 31 03 2009  
Financing: ZIT

## EU Network of Excellence "The European Polysaccharide Network"

Start: 01 05 2005  
End: 31 10 2009  
Financing: European Commission Brussels European Union

Molecular characterization of carbohydrate-specific antibodies against *Chlamydiae*

Start: 01 08 2004  
End: 31 07 2008  
Financing: FWF, Austrian Science Fund

## Synthesis and immunochemistry of lipopolysaccharide epitopes containing 4-Amino-4-deoxy-L-arabinose

Start: 01 03 2007  
End: 31 8 2010  
Financing: FWF, Austrian Science Fund

## Synthesis and derivatization of hemicellulose oligomers

Start: 01 02 2008  
End: 31 01 2012  
Financing: WOOD COMET

**Aminosugar modified Lipid A and analogues**

Start: 01 01 2009  
End: 31 12 2011  
Financing: FWF, Austrian Science Fund

**Division of Wood, Pulp and Fibre Chemistry**

## Chemistry of ortho-quinone methides

Start: 01 01 2005  
End: 31 12 2007  
Financing: FWF, Austrian Science Fund

## Spiro-polymerization: polytocopherols as antioxidants

Start: 01 11 2006  
End: 31 10 2009  
Financing: FWF, Austrian Science Fund

## Cellulose damage in historical papers

Start: 01 03 2006  
End: 28 02 2009  
Financing: FWF, Austrian Science Fund

## Cellodextrins – structure and dissolution

Start: 01 04 2005  
End: 31 03 2008  
Financing: FWF, Austrian Science Fund

## Entwicklung eines zerstörungsfreien Untersuchungsverfahrens zur Bestimmung des Schädigungsgrades von Cellulose

Start: 01 03 2006  
End: 28 02 2008  
Financing: PAL

## Reaction mechanisms in Organosolv-Pulping

Start: 01 04 2005  
End: 31 03 2008  
Financing: Wood K plus - Kompetenzzentrum Holz GmbH

**Residual chromophores in bleached pulps**

Start: 01 10 2006

End: 30 09 2009

Financing: Österreichische Forschungsförderungsgesellschaft mbH, FFG

**Synthesis of heterocyclic receptor agonists**

Start: 01 10 2006

End: 30 09 2009

Financing: Christian Doppler Forschungsgesellschaft (CDG)

**Christian-Doppler Laboratory "Advanced cellulose chemistry and analytics"**

Start: 01 10 2008

End: 30 09 2015

Financing: Christian Doppler Forschungsgesellschaft (CDG)

**CO<sub>2</sub>-binding of ammonoxidized lignins and their use as soil improvers**

Start: 01 05 2008

End: 30 04 2011

Financing: FWF, Austrian Science Fund

**Copper corrosion at illuminated manuscripts - evaluation of means of prevention and active conservation techniques**

Start: 01 09 2009

End: 31 08 2012

Financing: Österreichische Nationalbibliothek

**Sustainability of mass deacidification**

Start: 01 09 2009

End: 31 08 2012

Financing: Deutsche Nationalbibliothek

For more details about Scientific Projects look at [research information service](#)

## Cooperation Partners

### Division of Analytical Chemistry

D. Mattanovich, Department of Biotechnology, BOKU Vienna, Biomolecule quantification, metabolomics

M. Bichler, Atominsttitut der Universitäten, Certification of reference materials

P. Taylor/ Y.Aregbe, IRMM, Certification of reference materials/ metrology

M. Griesser, Kunsthistorisches Museum Wien, Elemental analysis

N. Jakubowski, ISAS Dortmund, Elemental labeling  
P. Petzelbauer, Medical University of Vienna, Elemental labeling  
P. Hoedl, PerkinElmer, Elemental mass spectrometry  
M. Horacek, ARC, Food authentication  
Z. Stefanka, Hungarian Academy of Sciences, Food authentication  
C. Máguas, Universidade de Lisboa, Food authentication  
G. Schatzmayer, Biomin, Food supplements  
S. Boulyga/ Schmitzer, IAEA, Hot particle analysis  
F. VanHaecke, University of Ghent, Isotope ratio analysis  
I. Garcia Alonso, University of Oviedo, Isotope ratio analysis  
M. Teschler-Nicola, Naturhistorisches Museum Wien, Isotope ratios/migration studies  
W. Berger, Medical University of Vienna, Metallo drugs  
R. Mader, Medical University of Vienna, Metallo drugs  
B. Keppler, University of Vienna, Metallo drugs  
M. Marchetti, Technical University Vienna, Metalloproteins  
I. Leito, University of Tartu, Metrology  
A. Zenker, Agilent, Molecular mass spectrometry  
A. Limbeck, Technical University Vienna, Platinum group elements  
W. Wenzel/ M. Puschenreiter, Institute of Soil Science, Rhizosphere research  
C. Hofer-Martinez, IAEA, Training  
A. Klik, Dep Water Atmosph. Envir., Ultratrace analysis of hazardous compounds  
A. Mentler, Institute of Soil Science, Ultratrace analysis of hazardous compounds  
R. Krachler/ B. Keppler, University of Vienna, Ultratrace analysis  
K. Deutsch, Federal Ministry of Agriculture, Forestry, Environment and Water Management, Ultratrace analysis of ground and surface water

### **Division of Biochemistry / Glycobiology**

H. Steinkellner, IAGZ, BOKU Vienna, Sialylation in plants  
R. Strasser, IAGZ, BOKU Vienna, Glycosylation in plants  
J. Strauss, IAGZ, BOKU Vienna, N2-pathway in plants  
D. Mattanovich, Dept. Biotechnology, BOKU Vienna, Pichia proteomics  
F. Ferreira, Univ. Salzburg, Weed allergens  
M. Schuster, Apeiron, MS of glycoproteins  
G. Stiegler, Polymun, MS of glycoproteins  
A. Weber, Baxter, Analysis of glycoproteins  
G. Gorr, Greenovation GmbH, Glycosylation in plants  
W. Hemmer, Floridsdorfer Allergiezentrum, CCD reactivity  
P. Jansen-Dürr, ÖAW, Innsbruck, C. elegans life-span  
J. Grillari, Dept. Biotechnology, BOKU Vienna, C. elegans life-span  
E. Razzazi-Fazeli, VetMed Univ. Vienna, MALDI-TOF MS  
J. Mucha, Slovak Academy of Sciences, Recombinant enzymes

S. Flitsch, University of Manchester, UK, Recombinant enzymes  
M. Tiemeyer, CCRC, Georgia, USA, Fly genetics  
A. Stütz, TU-Graz, Inhibitor synthesis  
P. Bonay, Universidad Autonoma de Madrid, Spanien, Parasites  
R. Geyer, University of Giessen, Germany  
J. Walochnik / D. Leitsch, Medical University of Vienna, parasites  
A. Joachim, VetMedUni Vienna, nematodes  
D. Jarvis, University of Wyoming, insect cells  
G. Vasta, University of Maryland, Baltimore County, glycan analysis  
M. Aebi, ETH Zürich, nematodes  
E. Fikrig, Yale University, tick glycosylation

### **Division of Biochemistry / Metalloprotein Research Group**

K. Bayer, Dept. of Biotechnology, BOKU Vienna, Bioprocess monitoring  
F. Rüker, Dept. of Biotechnology, BOKU Vienna, Antibody engineering  
G.A.Peschek, Dept. Biophysik, Uni. Vienna, Electron transport  
E. Malle, Center of Molecular Medicine, Graz, HDL modification  
A.J. Santabella, Dept. of Physical Chemistry and Engineering, Coruna, Halide oxidation  
G. Smulevich, Dept. of Chemistry, Florence, Resonance Raman Spectroscopy  
J. Arnhold, Inst. of Medical Physics and Biophysics, Leipzig, Redox potentials of short living intermediates  
G. Battistuzzi, Dept. of Chemistry, Modena, Electrochemistry  
I. Fita, Inst. de Biologia Molecular de Barcelona, X-ray crystallography  
A. Ivancich, Section de Bioenergetique, Saclay, ESR spectroscopy  
S. Baldus, Dept. of Cardiology, Hamburg, Neutrophil motility  
P.C. Loewen, Dept. of Microbiology, Manitoba, Catalase-peroxidase  
J. Kessler, Symbolon Pharmaceuticals, Massachusetts, Tyroidperoxidase  
W. H. Koppenol, Dept. of Chemistry and Applied Biosciences, ETH Zürich, Peroxynitrite  
A.J. Kettle, Department of Pathology Christchurch School of Medicine, Christchurch, Human peroxidases  
K. Djinic, Department for Structural and Computational Biology, Max F. Perutz Laboratories, Univ. of Vienna

### **Division of Organic Chemistry**

P. Messner, U. Sleytr, Centre Nanobiotechnol., Bacterial S-Layer glycans  
S. Arvand, Med. Univ. Vienna, Human Kinase  
I. Schabussova, Med. Univ. Vienna, Parasite immunology  
K. Mereiter, Technical Univ. Vienna, X-ray crystallography  
B. Kueenburg, Onepharm, Vienna, Saponins  
U. Jordis, Technical Univ. Vienna, Saponins  
J. Gass, Jungbunzlauer, NMR of Xanthans  
H. Sixta, Lenzing AG, Hemicellulose  
E. Selzer, Med. Univ. Vienna, NMR

A. Kungl, Univ. Graz, Growth factors  
H. Duchmann, Novatec, Germany Immune diagnostics  
E. Crouch, Univ. St. Louis, Lung surfactant proteins  
J. Head, Boston University, X-ray crystallography  
A. Imberty, CERMAV, Lectins  
H. Brade, Res. Centre Borstel, Serology of LPS  
R. Jerala, Dept. Biotech. Slovenia, Immunobiology of LPS  
S. Evans, Univ. Victoria, BC, X-ray crystallography  
R. McKenzie, NRC Ottawa, SPR of antigens  
J. Duus, Carlsberg Laboratories, High-Field NMR  
M. Valvano, Univ. Western Ontario, Heptose biosynthesis

### **Division of Wood, Pulp and Fibre Chemistry**

T. Bechtold, CD-Laboratory Dornbirn, Chemical modification of cellulosic fibers  
L. Gille, University of Veterinary Medicine, Vienna, EPR spectroscopy, antioxidant testing  
K. Christanis, University of Patras, Greece, Coal-based artificial humus materials  
J. Fischer, Dept. of Material Sciences and Process Engineering, scCO<sub>2</sub> treatments  
A. Forneck, Dept. of Applied Plant Sciences and Plant Biotech., GCMS analysis  
D. Haltrich, Dept. Food Sciences and Technology, BOKU Vienna, Enzymatic modification of cellulose  
K. Mereiter, Univ. of Technology, Vienna, X-ray crystallography  
K. Stolze, University of Veterinary Medicine, Vienna, Synthesis of spin traps  
G. Banik, Akademie der Bildenden Künste, Stuttgart, Conservational science  
A. Blüher, Swiss National Library, Bern, Switzerland, Evaluation of mass deacidification  
L. Bjerregaard, Ethnological Museum Berlin-Dahlem, Inka textiles  
I. Brückle, Stuttgart State Academy of Art and Design, Loan traffic of cultural objects, aging of paper  
E. Brendler, TU Bergakademie, Freiberg, Germany, Amoxidized technical lignins and lignite  
R. Buchner, University of Regensburg, Germany, Dielectric relaxation spectroscopy, cellulose solvents, thermodynamics of solutions  
A.-L. Dupont, Centre de Recherches sur la Conservation des Documents Graphiques, Paris, Tideline phenomena in paper  
A. French, USDA Agricultural research Service, New Orleans, USA, Solid state structure of cellulose  
U. Hähner, University of Applied Sciences and Arts, Hildesheim, Iron gall-ink corrosion  
C. Jäger, Bundesanstalt für Materialforschung Berlin (BAM), Solid state NMR spectroscopy  
B. Muk Jo, Kangwon National Univ. Chuncheon, South Korea, Hanji paper restoration  
T. Kawada, Kyoto Prefectural University, Japan, Synthesis of cellulose model compounds  
D. Klemm, Polymet Jena eV., Bacterial cellulose  
F. Mazzini, Pisa University, Italy, Synthesis of phenolic antioxidants  
F. Nakatsubo, Kyoto University, Japan, Synthesis of (isotopically labeled) cellulose  
H. Renfrew, University of Manchester, School of Textiles, UK, Synthesis of reactive dyes, fiber chemistry  
B. Saake, vTI Hamburg, GPC of (hemi)celluloses  
H. Shirai, Shinshu University, Japan, Dept. of Funct. Polym. Sci. Intelligent fibers and functional textiles



- A. Stanger, Technion Haifa, Israel, Computational chemistry
- C. Werner, Max Bergmann Biocenter Dresden, Germany, Cellulose aerogels
- U. Suess, Degussa Evonik, Germany, Chromophores in pulp
- T. Netscher, DSM Nutritional Products, Freiburg, Vitamin E chemistry
- T. Erata, Hokkaido University, Japan, Solid state NMR spectroscopy, special CPMAS NMR techniques
- H.-P. Fink, Fraunhofer Institut für Angewandte Polymerforschung, Potsdam-Golm, Germany, Molecular weight distributions of cellulose and starch
- A. French, USDA Agricultural Research Service, New Orleans, USA, solid state structure of cellulose and cellulose model compounds; computational carbohydrate chemistry
- C. Hofmann, Austrian National Library (ÖNB), Vienna, Austria, Conservation of paper
- B. Holmbom, and P. Fardim, Åbo Academy, Turku, Finland, TOF-SIMS analysis of labeled cellulotics
- I. Koegel-Knabner, TU München – Wissenschaftszentrum Weihenstephan, Germany, Solid state NMR spectroscopy of humic substances and soil
- H. Sixta, Helsinki University of Technology, Finland / Lenzing AG, Austria, pulp and paper technology
- E. Sjöholm, Innventia Stockholm (previous STFI), Sweden, Gel permeation chromatography of celluloses
- A. Stanger, Technion Haifa, Israel, Computational chemistry, quantum chemistry, electronic structure studies
- A. Treimanis, Riga Wood Research Institute, Latvia, Fiber peeling and fiber morphology
- Y. Uraki, Hokkaido University, Japan, Chemistry of Biomaterials
- C. Werner, Max Bergmann Institut, Dresden, Germany, Medical testing of cellulose aerogels
- T. Rypstra, University of Stellenbosch, South-Africa, Lignin, artificial humus materials

## Publications

### Division of Analytical Chemistry

#### Original articles and reviews in refereed journals

#### 2009

- \*\* Berthiller, F; Dall'asta, C; Corradini, R; Marchelli, R; Sulyok, M; Krska, R; Adam, G; Schuhmacher, R, (2009): Occurrence of deoxynivalenol and its 3-D-glucoside in wheat and maize. FOOD ADDIT CONTAM PART A-CH. 2009; 26(4):507-511
- \*\* Dornetshuber, R; Heffeter, P; Sulyok, M; Schumacher, R; Chiba, P; Kopp, S; Köllensperger, G; Micksche, M; Lemmens-Gruber, R; Berger, W, (2009): Interactions between ABC-transport proteins and the secondary Fusarium metabolites enniatin and beauvericin. Mol Nutr Food Res. 2009; 53(7):904-920
- \*\* Falta, T; Köllensperger, G; Standler, A; Buchberger, W; Mader, RM; Hann, S, (2009): Quantification of cisplatin, carboplatin and oxaliplatin in spiked human plasma samples by ICP-SFMS and hydrophilic interaction liquid chromatography (HILIC) combined with ICP-MS detection. J ANAL ATOM SPECTROM. 24:1336-1342

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\*\* Sar, D.G; Montes-Bayon, M; Gonzalez, E.B; Sierra, L.M; Aguado, L; Comendador, M.A; Köllensperger, G; Hann, S; Sanz-Medel, A,(2009): Quantitative Profiling of in Vivo Generated Cisplatin-DNA Adducts Using Different Isotope Dilution Strategies. *ANAL CHEM.* 2009; 81(23):9553-9560

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\*\* Boulyga, S.F; Heilmann, J; Prohaska, T; Heumann, K.G (2007): Development of an accurate, sensitive, and robust isotope dilution laser ablation ICP-MS method for simultaneous multi-element analysis (chlorine, sulfur, and heavy metals) in coal samples. *Anal Bioanal Chem.* 2007; 389(3):697-706

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\*\* Galler, P; Limbeck, A; Boulyga, SF; Stingeder, G; Hirata, T; Prohaska, T, (2007): Development of an on-line flow injection Sr/matrix separation method for accurate, high-throughput determination of Sr isotope ratios by multiple collector-inductively coupled plasma-mass spectrometry. *Anal Chem.* 2007; 79(13):5023-5029

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Böck, K., Hann, S., Heffeter, P., Berger, W., Köllensperger, G. (2009): Targeting metallo-drug-protein adducts by LC-ICPMS using antigen-antibody reactions. In: Francesconi, K. (Ed.), European Winter Conference on Plasma Spectrochemistry, Graz, AUSTRIA, FEB 15-20, 2009

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## Books and book chapters

### 2009

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Schrems, M.; Ebner, G.; Liebner, F.; Becker, E.; Potthast, A.; Rosenau, T. (2009): Side reactions in the system cellulose / 1-alkyl-3-methyl-imidazolium ionic liquid. In: ACS Symp. Ser. (T. Liebert, T. Heinze, K. Edgar, Eds.), Cellulose Solvents; American Chemical Society

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Potthast, A., Rosenau, T., Kosma, P. (2007): Carbonyl and carboxyl profiles as two novel parameters in advanced cellulose analytics. In: Argyropoulos, Dimitris S. (ed.), Materials, chemicals, and energy from forest biomass ACS Symposium Series 954, 513-530; American Chemical Society, Washington DC; ISBN 9780841239814

Rosenau, T. (2007): 2,2,5,7,8-Pentamethylchroman-6-ol (PMC) and related model compounds. In: Preedy V.R., Watson R.R. (Eds.), Encyclopedia of Vitamin E, 21-44; CABI Publishing, Oxford, Cambridge; ISBN 978-1-84593-075-2

Rosenau, T. (2007): Chemical modifications of alpha-tocopherol. In: Preedy V.R., Watson R.R. (Eds.), Encyclopedia of Vitamin E, 69-96; CABI Publishing, Oxford, Cambridge; ISBN 978-1-84593-075-2

Publications are also available at [research information service](#)

## Research Activities Abroad

Stefan Böhmdorfer, 2 month, Roche Pharma-ceuticals, Basel, Switzerland, 2009, "Chemistry of Tocopheramines"

Madeleine Dellmour: 3 month stay at the Australian Centre for Research on Separation Sciences (ACROSS), School of Chemistry, University of Tasmania, Australia

Lisa Fischer: 2 month stay at the Institute of Marine and Coastal Sciences, 71 Dudley Road, Rutgers University, New Brunswick, Rutgers University, New Jersey

Elisabeth Kloser, 3 month, Montreal University, Canada, 2008, "Chromane chemistry"

Karin Krainz, 2 month, Degussa Evonik, Hanau, Germany, 2009, "Chromophores in bleached pulps"

Elisabeth Lackinger, 3 month, The University of Tokyo, Japan, 2009, "Chemistry of paper sizing agents"

Falk Liebner, 3 month, Kyoto University, Japan, 2009, "Cellulosic aerogels"

Johannes Lesigang, visited the laboratory of Dr. Don Jarvis, 1 month, University of Wyoming, 2009

Anjan Patel, 2 month, Roche Pharma-ceuticals, Basel, Switzerland, 2007, "Oxidation chemistry of non-alpha tocopherols"

Martina Opietnik, 2 month, Kyushu University, Fukuoka, Japan, 2009, "Cellulose - gold nanoparticles"

Maximilian Popp, 3 month, Faculty of Chemistry, Department of Physical and Analytical Chemistry, University of Oviedo, Oviedo, Spain

Herwig Stepan June 2009 - Research at the University Giessen, Germany

Jutta Vlasits, 4 month, Department of Chemistry, University of Modena and Reggio Emilia, Modena, Italy, 2009

Iain Wilson visited the laboratory of Prof. Shi-Liang Wu at the Department of Biochemistry and Molecular Biology, School of Basic Medical Sciences, Institute of Bioengineering, Suzhou University, China in September 2009

## **External Teaching Activities**

Kyujin Ahn

Lectorship at the Akademie der bildenden Künste in Wien, Assistant teaching in conservation division, Assisting students in the identification of materials (mostly paintings)

Martin Gutternigg

is responsible for the biochemistry practical for the evening course in Bioengineering offered by the Fachhochschule Favoriten

Christina Haberhauer-Troyer

is lecturer of the FH-degree program "Bioengineering" at the FH Campus Wien

Stephan Hann

Lecturer in the post-graduate university courses 'Quality Assurance in the Analytical Laboratory' (University of Leoben) and 'Toxicology' (Medical University of Vienna).

Ute Henniges

Lectorship at the Akademie der Bildenden Künste (ABK-Stuttgart) "Evaluierung Alterungsverhalten von Cellulose", WS 2009, "Prinzipien der wässrigen Entsäuerung", SS 2010

Antje Potthast

is lecturer of the FH-degree program "Biotechnical Processes" in Tulln, Austria which is organized by the University of Applied Sciences at Wiener Neustadt (Fachhochschule Wiener Neustadt).

"Technologie der Zellulose", since 2005, 2 h, WS

Thomas Prohaska

is lecturer of the FH-degree program "Biotechnical Processes" in Tulln, Austria which is organized by the University of Applied Sciences at Wiener Neustadt (Fachhochschule Wiener Neustadt). "General and Inorganic Chemistry"

Manfred Schwanninger

is lecturer of the FH-degree program "Bioengineering" at the FH Campus Wien

Gerhard Stingeder

is lecturer of the FH-degree program "Biotechnical Processes" in Tulln, Austria which is organized by the University of Applied Sciences at Wiener Neustadt (Fachhochschule Wiener Neustadt).

"General and Inorganic Chemistry"

Erika Staudacher, September 2008, Guest lecturer and workshop organisation at the Department of Biochemistry, Kasetsart University, Bangkok, Thailand: "Glycomics: Biochemistry and Analysis of Glycans"

Petra Viehauser

is lecturer of the FH-degree program "Bioengineering" at the FH Campus Wien

Iain Wilson

is lecturer for the FH-degree programme in "Biomedical Analysis"

## **Habilitations**

Sergei Boulyga

"Auf der Spur der Umweltkontamination mit anthropogenen Actinoiden: von Tschernobyl bis Kosovo"

Johannes A. Schmid

"Wie molekulare Maschinen miteinander kommunizieren: Interaktion zwischen Entzündungs-Signalmolekülen und den zellulären Abbau-Maschinen (Ubiquitinylierungsenzymen und Proteasomen)"

Viktora Weber

"Die Pathophysiologie der Sepsis: neue Konzepte und Implikationen für die Therapieentwicklung"

## University management

Erika Staudacher

is Deputy Head of the senate since October 2009

Erika Staudacher

was Vice-Rector for Education and Internationalisation till September 2007

## Awards

Best Communication Award at 13th Electronic Conference on Synthetic Organic Chemistry, (ECSOC-13), Nov. 1-30, 2009

Marion Brunner, INITS award, 2008

Marion Brunner, BOKU Doc grant, 2009

Katharina Böck, Poster Award at the "4th International Conference on Metals and Genetics", Paris, 2008

Thomas Falta, Best lecture at "ICP-MS Anwendertreffen", Dresden 2008

Lisa Fischer, Junge Forschung Wasser, 2009

Ute Henniges, Award of excellence, 2008

Stephan Hann, Klaus Fischer Innovationspreis 2007

Stephan Hann, Fritz Feigl Award of the Austrian Society of Analytical Chemistry, 2008

Karin Krainz, KUWI grant, 2009

Karin Krainz, Poster price awarded by the International Pulp Bleaching Conference in Quebec, 2008

Ila Patel, Poster prize awarded by the International Carbohydrate Symposium in Oslo, 2008

Evelyn Rampler, Poster Award at "ICP-MS Anwendertreffen", Dresden, 2008

Andrea Rosenberger, Poster Award at the 43. Annual Meeting of the Austrian Society for Tropical Medicine and Parasitology (ÖGTP), November 2009

Thomas Rosenau, Hayashi Jisuke International Cellulose Award, 2007

Thomas Rosenau, Elected Fellow of the International Academy of Wood Science (IAWS) 2009

Christian Schimper, BOKU DOC grant, 2009

Christian Schimper, INITS award, 2009

Thomas Prohaska, Poster Award at the Plasma Winter Conference 2007

Iain Wilson, Novartispreis for Chemistry, 2007

### **External Lectures and Seminar Talks**

Gerald Ebner, Wilhelm Herok, EPNOE PhD meeting, Utrecht, 12-13 May 2009

Ute Henniges, Antje Potthast, IADA Conference, Wien, 17.09.-20.09. 2007

Ute Henniges, Conservation Conference, Bern, 05.09.-07.09. 2007

Ute Henniges, Austrian National Library, Vienna, 16. 03. 2007

Ute Henniges, Fragen des Alltags Antworten der Wissenschaft, Vienna, December 2008

Ute Henniges, Universities meet Public, April 2009

Gunda Köllensperger, hearing, candidate lecture, Johannes Gutenberg University, Mainz, 13. 02. 2007

Gunda Köllensperger, hearing, candidate lecture, Paris-Lodron University, Salzburg, 16.05. 2007

Gunda Köllensperger, GÖCH lecture series, Linz, 22.05. 2007

Gunda Köllensperger, ASAC lecture series, Wien, 06.12. 2007



Gunda Köllensperger, Adlershofer Kolloquium, Berlin, 12.06. 2007

Paul Kosma, Higher-carbon sugars of bacterial lipopolysaccharides: Synthesis and Interaction with antibodies and lectins, Closing Symposium of SFB 470 "From Glycobiology to Glycochemistry" University of Hamburg, May 28 and 29, 2009

Paul Kosma, Chemical synthesis of nucleotide activated heptoses and aminoarabinose LPS epitopes  
Research Centre Borstel, 12 February 2008

Paul Kosma, Synthesis and protein-carbohydrate interactions of complex sugars, TU Graz, Institute of Organic Chemistry and Competence Centre Biocatalysis, Graz, March 1, 2007

Paul Kosma, EPNOE Meeting, Iasi, 9 November 2007, Romania

Antje Potthast, PAL-Meeting C.-Mellon Foundation, Leipzig, 26.03-27.03. 2007

Antje Potthast, Zellcheming, Wiesbaden, 25.06. 2007

Antje Potthast, Ute Henniges, COST E41 Meeting, Bled, 22.11.-23.11. 2007

Antje Potthast, DFG-Kolloquium "Savinyi-Kollektion", Marburg, 26.06.-27.06. 2007

Antje Potthast, EPNOE final meeting Round robin tests GPC, Golm, 04.07. 2007

Antje Potthast, PTS Meeting, Dresden, 27.11.-28.11. 2007

Thomas Prohaska, Gesetz der Zyklizität und Evolution; Spiritualität und Bewußtsein, SEIVO Workshop 'Bewusstsein Leben', Vienna, AUSTRIA, NOV 23-25, 2007

Dubravko Rendić, Iain Wilson and Erika Staudacher September 2009, Joint Japan/Austria Seminar on Comparative and Developmental Glycobiology, Tokyo, Japan

Thomas Rosenau, EPNOE Meeting at VTT, Helsinki, Finland, 19.06. 2007

Thomas Rosenau, "Chance nachwachsender Rohstoffe", Ried, 06.09.-07.09. 2007

Erika Staudacher, Seminar at Nagaoka University, Japan, September 2009

Erika Staudacher, Lecture at the Intern. Symposium on Glycoconjugates, Puerto Rico, USA, November 2009

Yuko Yoneda, Ivana Tot, Karin Krainz, EPNOE PhD meeting, Jena, 02.04.-04.04. 2007

Iain Wilson, Glycobiology China, Suzhou, June 2008

Iain Wilson, Institut für Mikrobiologie, ETH Zürich, September 2008.

Iain Wilson, invited seminar, Abteilung für Biochemie und Molekularbiologie, Universität Hamburg, January 2009

## Press Reports

Anna Bogolitsyna, Antje Potthast, Thomas Rosenau, Nebenprodukte identifizieren und verwerten, Der Lenzinger, 3/09

Paul Kosma, Sind wir High-Tech Geräten ausgeliefert? Die Presse, 1.4. 2008

Paul Kosma, Wie Antennen auf der Zelle, Die Presse, 26.7. 2009

Falk Liebner, Thomas Rosenau, Emmerich Haimer, Georg Pour, Zum Verbrennen viel zu schade, Wiener Zeitung, 24.12.2009

Christian Obinger, Proteine, die Krebszellen aufspüren und vergiften - Mit der Entwicklung neuer Antikörper beschäftigt sich ein neues CD-Labor an der BOKU. Die Krebsmedizin sieht darin großes Potenzial, Die Presse, 2. 12. 2008

Christian Obinger, Im Atem eines evolutionären Multitalents - Wiener Chemiker entschlüsseln wichtige Prozesse in der Atmungskette von Cyanobakterien, Universum – ORF, Oktober 2008

Christian Obinger, Chemiereport Engineering an Antikörpern - Eröffnung des Christian Doppler Labors für Antikörperengineering, August 2009

Christian Obinger, Die Tumorzelle von innen sprengen - Neues Christian Doppler Labor an der BOKU, Standard 30. 9. 2009

Antje Potthast, Christa Hofmann, Museum forscht, Die Presse am Sonntag, 02.08.2009

Antje Potthast, Thomas Rosenau, Die Zeitung der Zukunft: Papier wie Glas, Die Presse, 31.04.2009

Antje Potthast, Thomas Rosenau, Auf der Suche nach intelligenten Windeln, Die Presse Forschung, Februar 2009

Antje Potthast, Thomas Rosenau, Verwertung von bisher nicht genutzten Nebenprodukten, CD-Labors Spezial

Antje Potthast, Thomas Rosenau, Kann man Pflanzenreste tanken? Die Presse, 02.12.2008

Antje Potthast, Thomas Rosenau, Von smarten Tissues: Neues Cellulose-Labor in Wien, Chemiereport, November 2008

Antje Potthast, Thomas Rosenau, Doppler-Labor an der BOKU Wien, Economy, 17.10.2008

Antje Potthast, Thomas Rosenau, Cellulose im Zentrum eines neuen Labors, Medianet, 07.10.2008

Antje Potthast, Wenn Bücher sauer werden, Der Standard, 01.10.2008

Antje Potthast, Thomas Rosenau, Ö1 Wissen aktuell, 24.09.2008, 13.55 Uhr

Antje Potthast, Thomas Rosenau, Ute Henniges, Alte Papiere, Papier aus Österreich, September 2008

Thomas Rosenau, Oxidation von Vitamin E, Österreichische Apothekerzeitschrift, 05.01.2009

## Invited Speakers

Laszlo Abranko, Corvinus University Budapest: "Analysis of environmental contaminants in food"

Lena Bjerregaard, M.Sc., Ethnological Museum Berlin, Germany, "World of Inca-TheLeymebambaTextiles"

Roland Schauer, Biochemisches Institut, Universität Kiel, Germany, "Sialic Acids: Regulators of Molecular and Cellular Interactions"

Harry Schachter, Hospital for Sick Children, Toronto, Canada "Bringing Coal to Newcastle: The Role of N-glycans in Worm and Fly Development"

Prof Erhard Oeser, University of Vienna, Austria, "Kollektives Bewußtsein"

Carlo Unverzagt, Bioorganische Chemie, Universität Bayreuth "Synthese von einheitlichen Glycoproteinen durch chemische und molekularbiologische Methoden"

Hans-Ulrich Süss, Degussa, Hanau, Germany, "Stand der Technik bei der Zellstoffbleiche"

Hans-Peter Fink, Fraunhofer-Institut für Angewandte Polymerforschung, Golm, Germany, "Cellulose – unerschöpfliches Biopolymer mit neuen Perspektiven"

Rupert Sheldrake, "A new sciences of life: morphic resonance and the memory of nature"

Anne-Laurence Dupont, Centre de Recherche sur la Conservation des Collections Muséum National d'Histoire Naturelle Paris, "Characterisation of cellulose degradation at the wet-dry interface"

Wolfgang G. Glasser, Virginia Tech, "Polymers from Biomass- Controlling Properties via Chemical Modification"

Giantantonio Battistuzzi, Department of Chemistry, University of Modena and Reggio Emilia, Italy, "Engineered metalloproteins for electrochemical sensing devices"

Valerian E. Kagan, Department of Environmental and Occupational Health, University of Pittsburgh, PA, USA, "Let sleeping dogs lie: apoptotic wakening of cytochrome *c* as a peroxidase"

Michael E. Ketterer, Department of Chemistry and Biochemistry, Northern Arizona University, "Plutonium in the global environment: forensic and geochemical studies with MS"

Jean-Marie Lehn, Vienna seminars of noble laureates, "Perspectives in Chemistry: From Supramolecular Chemistry towards Adaptive Chemistry"

P. Miethe, DI K. Frankenfeld, fzm GmbH –Forschungszentrum für Medizintechnik und Biotechnologie Bad Langensalza, Deutschland "Bakteriencellulose –Herstellung und Anwendung"

Norbert Nimmerfroh, Evonik–DEGUSSA AG, Hanau "Wasserstoffperoxid–mehr als eine Grundchemikalie"

Heike Knicker, Technische Universität München, Institut für Bodenkunde, "Characterisation of humic substances by means of  $^{13}\text{C}$  and  $^{15}\text{N}$  CPMAS NMR spectroscopy"

Alfred Vendl, Universität für Angewandte Kunst Wien, "Science Visualization –fascinating examples"

Christian Patemann, Director of Biotechnology, Agriculture and Food Research, European Commission, Research Directorate, "Knowledge Based Bio-Economy in Europe –from Concept to Practice"

Alfred French, USDA ARS, New Orleans, "Hydrogen bonding and symmetry in cellulose"

Hans-Ulrich Melchert, Analytical & Epidemiological Services, Robert-Koch-Institut Berlin, "Die Tocopherole–Analytik, Physiologie, Technologie"

Rafał Ziobro, Faculty of Food Technology, Agricultural University, Kraków, "Advances in the field of cereal products –physicochemical and nutritional aspects"

Roman Jerala, Dept. Biotechnology, Univ. Ljubljana, "Sequestration of bacterial LPS and inhibition of MD-2 to prevent excessive immune response"

## Scientific Events

Stephan Hann was scientific member of the advisory board of the 7th International Symposium on Speciation of Elements in Biological, Environmental and Toxicological Sciences, 2009

Stephan Hann was member of the organization committee of the EUROANALYSIS 2009

Paul Kosma was organizer of Eurocarb 15 (19-24 July, 2009, Vienna) and is president of the European Carbohydrate Organization (2009-2011)



15<sup>th</sup> European Carbohydrate Symposium



Paul Kosma was organizer of the 12.Österr. Kohlenhydratworkshop (BOKU) 21. 2. 2008

Gunda Köllensperger was a member of the scientific committee of the 4th International conference on trace element speciation in biomedical, nutritional and environmental sciences, May 2008, Munich

Gunda Köllensperger was a member of the scientific committee of the The 3rd International Sector Field Inductively Coupled Plasma Mass Spectrometry Conference, September 2008, New Brunswick

Christian Obinger was member of the Scientific Committee of the 5th International Meeting on Human Peroxidases, New Zealand, 2007

Christian Obinger was member of the Scientific Committee of the 6th International Meeting on Human Peroxidases, Capel Hill, North Carolina, USA, 2009

Antje Potthast was co-organizer of the COST E54 Meeting "Characterization of fine structure and properties of papermaking fibers using new technologies", Feb 14-15, 2007, Vienna

Antje Potthast was co-organizer of the Bleaching in paper conservation, 2009

Thomas Rosenau was co-organizer and member of the Scientific Committee of the 2nd International Cellulose Conference 2007 (ICC2007), Tokyo, Japan, October 22-25, 2007

Thomas Rosenau was co-organizer of the Japanese-European Workshop "Cellulose and Functional Polysaccharides", Kyoto, Japan, October 29-31, 2007

Thomas Rosenau was organizer of the COST FP0901 meeting, 2009

Thomas Rosenau was organizer of the Cell Division, Lignin Symposium, and the Anselme Payen Award Symposium, at the 237th National Meeting of the American Chemical Society, March 22-26, 2009, Salt Lake City, UT, USA.

Thomas Rosenau was member of the scientific council of the International Symposium on Wood, Pulp and Fiber Chemistry, 2009

Thomas Rosenau was member of the scientific council of the European Workshop on Lignocellulosics and Pulp, EWLP 2008

Gerhard Stingeder was member of the board of the Austrian Society of Analytical Chemistry - ASAC

Iain Wilson was co-organiser of the Austria/Japan Seminar on Comparative and Developmental Glycobiology, co-financed by the FWF and the JSPS, 2009

## Visiting Scientists

Ahmed Aufy since January 2009

Gerhard Banik, State Academy of Fine Arts, Stuttgart, Germany, Paper conservation, since 2008

Toshiyuki Takano, Kyoto University, Japan, Lignin hydrogels / JSPS-FWF, 8 months, 2008

Makiko Enoki, Tokyo Marine University, Japan, Chemistry of poly-isoprene, JSPS, 10 months, 2009

Zakaria Sarani, National University of Malaysia, Chemistry of palm components, Science Fund Malaysia 12 months, 2009/10

Midori Takasaki, Shinshu University, Ueda, Japan, Mulberry paper fibers, GPC of mulberry paper, Global CoE scholarship, 4 month, 2009/10

Francisco Javier González-Vila, IRNAS Sevilla, Spain, Curiepoint Pyrolysis GC/MS of humic substances, 1 month, 2009/07

Eva Hummert, Stuttgart State Academy of Art and Design, Conservation, consolidation of powdering paints layers

Murside Kes, NTNU Trondheim, GPC of degraded cellulose, 2009

Keita Sakakibara, Kyoto University, Synthesis of conducting cellulose derivatives, 2009

Andriana Giannouli, University of Patras, Characterization of charcoal samples by GC/MS, FT-IR and DSC, 2008

Ivonne Müller, Max-Bergmann-Zentrum für Biomaterialien, Dresden, Cellulose-GPC, 2008

Peter Sawinski, RTH Aachen, Aerogels from cellulose phosphates, 2008

Valentina Homa, IAESTE fellow, Universität Ljubliana, Aerogels from cellulose phosphates, 2008

Anne-Laurance Dupont, STSM COST E41, Centre de Recherche sur la Conservation des Collections, Characterization of wet dry interfaces on cellulose, Paris

Kåre Kristiansen, NTNU Trondheim, Norwegen, 2007

Myung-Joon Jeong, Dongguk University, Seoul and National Research Institute for Cultural Heritage, South Korea, 2007

Katarina Schumann, TU Leipzig, Mass deacidification of paper, 2007

Agnieszka Bis, IAESTE fellow, University of Wrocław, 2007

Alexander Titz, EMBO short term fellow, ETH Zürich, 2008

Ivana Tomcová, Ernst Mach Stipendium, Slovak Academy of Sciences, 2009

Sonia Serna, CIC Biomagune, San Sebastian, 2009

### **Other External Activities of the Members of the Department**

Falk Liebner organized the Christmas lecture 2007, 2008 and 2009

Gunda Köllensperger 2007-2009: Advisory board of Journal of Analytical Atomic Spectroscopy (RSC)

Gunda Köllensperger 2008: 4th International conference on trace element speciation in biomedical, nutritional and environmental sciences; scientific member of the advisory board

Gunda Köllensperger 2009: Editorial board of Journal of Analytical Atomic Spectroscopy (RSC)

Paul Kosma is member in the Scientific Advisory Board of ERA-Instruments Funding in Life Sciences

Paul Kosma was Member of the Scientific Advisory Board of the 14th European Carbohydrate Symposium, 2007

Paul Kosma was Member of the Scientific Committee Carbohydrates as Organic Raw Materials V, 2009

Paul Kosma is Member of Board of Delegates in Austrian Science Fund FWF

Paul Kosma is Member of the Board of WOOD COMET

Paul Kosma is in the Editorial Advisory Board of *Journal of Innate Immunity*, *Carbohydrate Research* and *Lenzinger Berichte*

Thomas Prohaska is observer to the Commission on Isotopic Abundances and Atomic Weights (CIAAW) of the International Union of Pure and Applied Chemistry

Erika Staudacher was external examiner of a PhD-thesis in Madrid, Spain, October 2008

Gerhard Stingeder is Member of the board of the Austrian Society of Analytical Chemistry - ASAC



Iain Wilson is Deputy Member of the Board of the Austrian Science Fund (FWF), Member of the Editorial Advisory Board of the Biochemical Journal, Member of the Steering Committee of the ESF-funded Euroglycosciences research network programme

Iain Wilson was external examiner of a PhD thesis at the Université Lille, December 2007, and is a member of two PhD advisory committees at the ETH Zürich

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## Impressum

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