



Swiss Society for Optics and Microscopy

Société Suisse pour l'Optique et la Microscopie

Schweizerische Gesellschaft für Optik und Mikroskopie

Mitteilungsblatt/Bulletin d'information 1/2004

EOS Topical Meeting

OPTICS IN COMPUTING

April 21-23, 2004

Engelberg, Switzerland

www.oic2004.com

SWISS SOCIETY FOR OPTICS AND MICROSCOPY
www.ssom.ch
BOARD MEMBERS 2004 - 2006

President

Dr. Kurt Pulfer
SOLVIAS AG, Klybeckstrasse 191, WKL-127.634, Postfach,
CH- 4002 Basel, Tel. +41 61 686 62 21, Fax +41 61 686 60
96, kurt.pulfer@solvias.com

Redactor

Dr. Reto Holzner
Apfelbaumstrasse 2, CH-8050 Zürich Tel. +41 1 312 15 63,
reto.holzner@hispeed.ch

Treasurer

Marcel Düggelin
Zentrum für Mikroskopie ZMB, Bio-Pharmazentrum, Universität
Basel, Klingelbergstrasse 50/70, CH-4056 Basel, Tel. +41 61
267 14 02, Fax +41 61 267 14 10, marcel.dueggelin@unibas.ch

Webmaster

Daniel Mathys
Zentrum für Mikroskopie ZMB, Bio-Pharmazentrum, Universität
Basel, Klingelbergstrasse 50/70, CH-4056 Basel, Tel. +41 61
267 14 01, Fax +41 61 267 14 10, daniel.mathys@unibas.ch

**Optics Section
Secretary**

Prof. Dr. Hans Peter Herzig
Institut de Microtechnique, Rue A.-L.
Breguet 2, CH-2000 Neuchâtel, Tel. +41
32 718 32 70, Fax +41 32 718 32 01,
hanspeter.herzig@unine.ch

**Microscopy Section
Secretary**

Dr. Markus Dürrenberger
Zentrum für Mikroskopie ZMB, Bio-
Pharmazentrum, Universität Basel,
Klingelbergstrasse 50/70, CH-4056
Basel, Tel. +41 61 267 14 04, Fax +41
61 267 20 78,
markus.duerrenberger@unibas.ch

**Nanotechnology Section
Secretary**

PD Dr. Harry Heinzelmann
CSEM, Nanoscale Technology &
Biochemical Sensing, Jaquet-Droz 1,
CH-2007 Neuchâtel, Tel. +41 32 720 55
33, Fax +41 32 720 57 50,
harry.heinzelmann@csem.ch

**Optics Section
Board**

Dr. Bernhard Braunecker
Leica Geosystems AG, Corporate
Technology Center, CH-9435 Heerbrugg,
Tel. +41 71 727 3577, Fax + 41 71 726
5577, Bernhard.Braunecker@leica-geosystems.com

**Microscopy Section
Board**

Prof. Dr. med Peter Eggli
Anatomisches Institut Uni Bern,
Bühlstrasse 26, Postfach, CH- 3000
Bern 9, Tel:+41 31 631 84 79, Fax +41
31 631 34 10, eggli@ana.unibe.ch

**Nanotechnology Section
Board**

Prof.Dr. Christian Schönenberger
Institut für Physik, Klingelbergstrasse 82,
4056 Basel, Tel: +41 61 267 36 90
Fax : +41 61 267 37 84
Christian.Schoenenberger@unibas.ch

Dr. Fabienne Marquis Weible
Institut de Microtechnique, Université de
Neuchâtel, Jaquet-Droz 1, CH-2007
Neuchâtel, Tel. +41 32 720 54 77, Fax
+41 32 720 57 11,
fabienne.marquis-weible@unine.ch

Dr. Heinz Gross
Elektronenmikroskopie-Zentrum der ETH
Zürich, c/o Institut für angewandte
Physik, CH-8093 Zürich, Tel. +41 1 633
33 04, Fax +41 1 633 11 05,
heinz.gross@iap.phys.ethz.ch

Dr. Jens Gobrecht
Paul Scherrer Institute, Laboratory for
Micro- and Nanotechnology, CH - 5232
Villigen-PSI, Tel: +41 56 310 2529,
jens.gobrecht@psi.ch

Dr. Markus Rossi
Heptagon Zürich, Office c/o CSEM,
Badenerstrasse 569 CH-8048 Zürich Tel.
+41 1 497 30 03, Mobile +41 79 470 24
91, Fax +41 1 497 30 01,
markus.rossi@heptagon.fi

Prof. Dr. Lukas Landmann
Universität Basel, Anatomisches Institut,
Pestalozzistr. 20, CH-4056 Basel, Tel:
+41 61 267 39 33, Fax +41 61 267 39
59, lukas.landmann@unibas.ch

Prof. Dr. Markus W. Sigrist
Institut für Quantenelektronik, ETH-
Hönggerberg HPF D 19, CH-8093 Zürich,
Tel. +41 1 633 22 89, Fax +41 1 633 10
77, sigrist@iqe.phys.ethz.ch

Dr. Robin Schaublin
Centre de Recherches en Physique des
Plasmas, EPFL, CH-5232 Villigen-PSI,
Tel. +41 56 310 40 82, Fax +41 56 310
45 29, Robin.Schaublin@psi.ch

Prof. Dr. Thomas Graf
University of Bern, Institute of Applied
Physics, Sidlerstrasse 5, CH-3012 Bern,
Tel. +41 31 631 89 38, Mobile +41 79
648 33 83, Fax +41 31 631 37 65,
thomas.graf@iap.unibe.ch

Dr. Patrick Schwarb
IMAGIC AG, Kanalstrasse 27, CH-8152
Glattbrugg, Tel. +41 1 809 40 60, Fax
+41 1 809 40 61, schwarb@imagic.ch

Dr. Berthold Schmidt
Bookham Switzerland AG, Binzstrasse
17, CH-8045 Zurich, Tel. +41 1 455 85
94, Fax +41 1 455 85 86,
berthold.schmidt@bookham.com

Prof. Dr. Pierre Stadelmann
EPFL, CIME, MXC, CH-1015 Lausanne,
Tel. +41 21 693 29 76, Fax +41 21 693
44 01, pierre.stadelmann@epfl.ch

Inhaltsverzeichnis

SSOM

From the President	<i>by Kurt Pulfer</i>	4
Annual report	<i>by Kurt Pulfer</i>	5
SSOM financial report 2003	<i>by Marcel Düggelin</i>	6
Nanometers for Megapixels	<i>by Markus Rossi</i>	8

Optics Section

Announcement EOS topical meeting		10
----------------------------------	--	----

Microscopy Section

Obituary for Wilfried Wintsch	<i>by Roland Wessicken and Richard Guggenheim</i>	11
-------------------------------	-------------------------------------------------------	----

SSOM Agenda 2004		12
Courses and Conferences 2004		13
SSOM Anmeldeformular / Demande d'adhésion		

From the president

Dear member,

The same procedure as every year...

As a society we have to exercise our duties at the end of a year or at the beginning of a new one: our cashier Marcel Düggelin has to close the books and invite the auditors to check them. You will find details inside this bulletin. The president has to deliver the annual report to the academies SANW and SATW, and the board holds its annual meeting to discuss concerns of the society and organize the year's program.

This year we met the first time with our new colleagues from the nano section. We are confident that they are capable to make this section into a strong and important part of our society.

The activities of the SSOM start as usual in Engelberg. From April 21 – 23 the EOS Topical Meeting takes place in the usual location. This year's topic is: "Optics in Computing". The organization lies in the hands of the EOS. For more details see this bulletin and on our homepage in the internet.

For the members of the microscopy section there is a basic course in microscopy at the University of Basel (20. August 2004: 'Basiskurs Mikroskopie'. Vermittelt Grundkenntnisse in allen Mikroskopie-Arten (inkl. AFM) in Theorie und Applikation.)

As a special event there is the 13th European Microscopy Congress, EMC 2004 in Antwerp, Belgium, from 22 - 27 August 2004. Details in the internet under <http://www.emc2004.be/>

There will be no general assembly this year. The next one takes place in Davos during the International Microscopy Conference (Dreiländertagung), which takes place from August 28 to September 2 in 2005.

As in every even year the sections of our society meet separately. You will be informed by the secretaries when and where the section-meetings will take place.

Although there is still snow around us we can see and hear already the first signs of spring: the snowdrops and other early flowers blossom and some birds such as blackbirds start singing in the mornings and evenings and announce the coming of the warmer season.

With best regards



Kurt Pulfer
President SSOM

Jahresbericht 2003

Die Jahresversammlung fand am 24. Oktober am PSI in Villingen statt. Als Höhepunkt der Veranstaltung wurden der Leica-Preis an Bernd Nöhammer vom PSI verliehen.

Ferner hat die SSOM folgende Veranstaltung organisiert:

- 10. Engelberg lectures in Optics zum Thema "Laser Application", 3. - 6. März

Die Vertreter der Gesellschaft in den nationalen und internationalen Gremien haben ihre Funktion wahrgenommen. Von der Förderung jüngerer Wissenschaftler durch die Übernahme von Reisekosten wurde rege Gebrauch gemacht. Eine Neuauflage unseres YEARBOOK 2003 sowie die vierteljährlichen Mitteilungsblätter sind erschienen. (Druck: 600 Ex., die anderen Mitglieder wünschen das Bulletin elektronisch. www.ssom.ch)

An der Mitgliederversammlung wurden die Statuten geändert und Wahlen haben stattgefunden. Die neuen Statuten brauchte es, weil die Sektion Nanotechnologie gegründet wurde. Es handelt sich dabei um die ehemalige SGNT (Schweizerische Gesellschaft für Nanowissenschaften und Nanotechnik), die sich am 1. Juli 2002 aufgelöst hat. Sekretär ist PD Dr. Harry Heinzemann, CSEM Neuchâtel.

Mitgliederzahlen:	Einzelmitglieder	444
	Kollektivmitglieder	69
	Delegierte	201
	Freimitglieder	11

Dach-oder Schwestergesellschaften:

SANW, SATW
Optik: ICO; EOS
Mikroskopie : IFSM, EMS

12.12.03 Kurt Pulfer

SSOM Jahresrechnung 2003

Kassabuch 2003

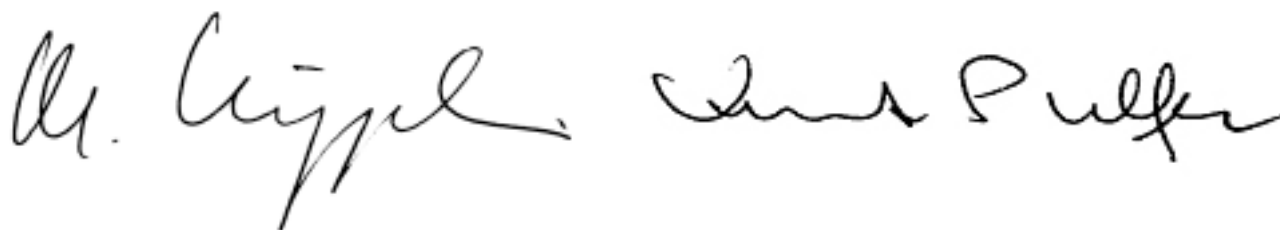
Abschluss nach Kostenart per 31.12.2003

Ausgaben und Einnahmen	Belastung	Gutschrift	Saldo
Adm. Sekretariat	10762.22	0.02	-10762.20
Beitrag an Organisationen	8430.85		-8430.85
EOS-Meeting	48994.20	52480.00	3485.80
Fonds	84353.00	90785.00	6432.00
Lille	677.55		-677.55
Mitgliederbeiträge		21842.05	21842.05
Nachwuchsförderung	4550.00	2500.00	-2050.00
Publikationen	5790.70	2000.00	-3790.70
SANW	2500.00		-2500.00
Zinsen		1059.80	1059.80
Total	166058.52	170666.87	4608.35
		166058.52	
Gewinn 2003		4608.35	

Basel, 14. Januar 2004

Der Kassier Marcel Düggelin

Der Präsident Kurt Pulfer

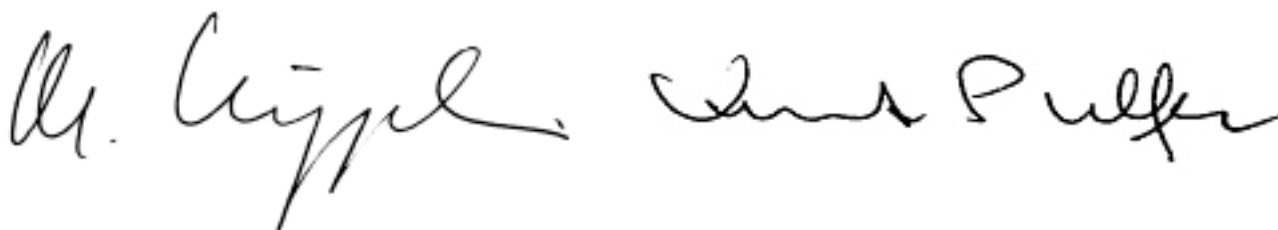


Bilanz per 31. 12. 2003

AKTIVEN	Engelbergkonto UBS	11587.80	
	Sparkonto ZKB	21680.85	
	Kontokorrent CS	34039.20	
	PC-Herbsttagung Basel	478.20	
	Postcheckkonto	5414.75	
	Verrechnungssteuerguthaben 2002	473.45	
	Verrechnungssteuerguthaben 2003	370.90	
	Fonds Ausgewogen ZKB	90785.00	
	Vorschuss Davos	912.30	
PASSIVEN	Eigenkapital 1.1.2003		161134.10
	Gewinn 2003		4608.35
		165742.45	165742.45

Der Kassier Marcel Düggelin

Der Präsident Kurt Pulfer



Revisorenbericht

Die Rechnung der SSOM für das Jahr 2003 wurde von den Revisoren geprüft und in allen Belangen als richtig befunden. Die sorgfältige und korrekte Arbeit des Kassiers wird bestens verdankt. Die Revisoren empfehlen der Mitgliederversammlung die Rechnung zu genehmigen und dem Kassier Entlastung zu erteilen.

Basel, 27. Februar 2004



Helge Rixner-Paulus



Victor Colombo

Nanometers for Megapixels

Micro-optics: everyday applications – demanding requirements

Micro-optical elements have found their way into many high products being produced in very high volumes. The range of applications goes much further than micro-optical components for telecom and datacom. Nowadays you can find micro-optics – typically so-called "pattern generators" – in many popular electronic devices. However, despite at least 20 years of intensive R&D on design and fabrication of micro-optics, even these "common" mass products pose a number of very challenging tasks for state-of-the-art technology. Two examples will shine some light on these challenges.

Foolproof autofocus

In a review on the SONY DSC-V1 Cyber-shot digital still camera I recently read the following statement: *"The #1 complaint we constantly hear from digital camera enthusiasts has to be the poor low-light focus ability of most digital cameras. Whereas other digital cameras also have low-light focus-assist AF (better a little than none), only the Sony 'Hologram AF™' works practically foolproof, thus removing the low-light focusing complaint."*



On the official SONY web page you can find a more technical description of this "magic" autofocus system: *"To insure that the zoom lens is always sharply focused the DSC-V1 is equipped with Hologram AF illuminator that "paints" the subject with a safe Class 1 laser pattern."* The only possibility to create a laser pattern is by using a diffractive optical element. This particular product has been calculated and is being fabricated by the Swiss-Finnish company Heptagon. The diffractive element – a pattern generator – splits an incoming laser beam into a large number of copies, in this case



arranged into 30 stripes each one consisting of 16 spots of equal intensity. The optical microstructure fulfilling this task is calculated by an algorithm called "iterative Fourier transform algorithm" (IFTA). The solution is a binary (two-level) diffraction grating with feature sizes of $\approx 1 \mu\text{m}$ and a profile depth of $\approx 0.65 \mu\text{m}$. The design and even the fabrication of a master structure are at first sight straightforward, although they still require sophisticated (typically proprietary) design software and excellent mastering technologies.

The most challenging part lies in the tolerances in high-volume production, in this case by micro-injection molding. It is a property of diffractive pattern generators that the slightest deviations from the theoretical profile shape result in an increase of the undiffracted light (the "zeroth order"), i.e. any fabrication error will yield a bright spot in the center of the pattern. However, the autofocus principle as well as eye-safety regulations

prohibit the appearance of this effect. In the autofocus application, the maximum contribution of all fabrication effects is a 0th diffraction order of 0.2% of all laser light (then it is as strong as all the 500 other orders in the pattern). Typical fabrication tolerances will be a rounding of the two-level profile or slight changes in the height difference of the two levels. A theoretical analysis shows that 0.2% light in the 0th order translate into a maximum profile depth error of the of less than 20 nm!

The whole micro-optics production chain needs therefore to be optimized to guarantee that the final elements will be below 20 nm profile deviation for millions of parts. The success of this "foolproof autofocus" in the market shows that this high goal can be achieved by state-of-the-art technologies.

Thousands of orders for a light touch

The second application of micro-optical elements in consumer electronics is even more exciting and demanding. Various companies are launching so-called "virtual keyboards". These accessories for PDA's and smart phones are projecting a full-size keyboard on which the user can type his notes and messages. A sophisticated detection principle determines which key has been hit and transfers the information to the PDA or cell phone.



The keyboard projection unit consists of a laser and a diffractive pattern generator. The requirements on the micro-optical part are even more demanding than for the autofocus application:

- The projected pattern is very complex; several thousand diffraction orders in a grid of many million raster points have to be controlled in the design process. This points out the demand for very efficient and well-converging implementations of the standard "IFTA" design code; something that commercial design software can not deliver yet. In addition, grating aberrations need to be corrected for carefully, otherwise straight lines in the projected patterns are not possible.
- The opening angle of the pattern is very large, it exceeds the value of 75°. The feature size of a diffractive element is inversely proportional to the opening angle, i.e. extremely small features will have to be realized. In this case, the smallest features have a size of 400 nm with a depth of up to 900 nm! Realizing such microstructures is extremely demanding and at the front of the R&D of university laboratories, institutes and specialized companies.
- *Every photon counts!* Since the virtual keyboards will be used in mobile devices and draw power from their batteries, the diffraction efficiency has to be as high as ever possible. Fabrication tests showed that micro-injection molding tends to reduce the overall efficiency of such optical microstructures by up to 20%. Therefore, new fabrication technologies (so-called wafer-scale UV-replication) had to be developed to realize such a demanding product in high volumes and low at low cost.

Markus Rossi, Heptagon Oy
Badenerstrasse 569, CH-8048 Zurich
markus.rossi@heptagon.fi

Announcement EOS topical meeting

EOS Topical Meeting
OPTICS IN COMPUTING 2004

April 21-23, 2004 in Engelberg, Switzerland

Scope of the meeting

The meeting will deal with the fundamentals of information optics and its applications in processing, storage, and data communications. The goal is to give a comprehensive overview of all relevant areas, i.e. ranging from material research via devices to applications. The purpose of the conference is to provide a platform for relatively mature areas (multi-dimensional imaging and sensing, interconnection and switching, for example) as well as to feature new trends in relevant areas such as micro- and nano-optics, biophotonics, Tera-Hertz optics, novel schemes for logic and architectures, etc.

The OIC 2004 Programme and Registration are now available!

www.oic2004.com

Obituary for Wilfried Wintsch

Zum Gedenken an Wilfried Wintsch



Wilfried Wintsch (geboren am 24. Dezember 1941) ist nach langer, schwerer Krankheit am 8. Februar 2004 gestorben.

Nach seiner Ausbildung zum Maschinenschlosser absolvierte er das Technikum in Winterthur und schloss dort als Elektroingenieur HTL ab. Nach 5 Jahren an der EMPA-Dübendorf, wo er hauptsächlich an der Mikrosonde arbeitete, wechselte er zu Sulzer Winterthur in die Gruppe Analytik der Forschungsabteilung in Oberwinterthur, die er mit grossem Erfolg leitete. 1999 erkrankte er schwer und musste seine Arbeit leider aufgeben.

Wilfried Wintsch war ein hochbegabter Mikroskopiker und Analytiker, der seine reiche Erfahrung, sein breites Wissen und Können grosszügig jedermann zur Verfügung stellte. Seinen Resultaten konnte man voll vertrauen, denn er war gegenüber sich und seiner Arbeit sehr kritisch eingestellt. Wilfried war ein hilfsbereiter und äusserst lebenswürdiger Kollege, der begeistern und mitreissen konnte. An nationalen und europäischen Tagungen war er ein gern gesehener Referent und Teilnehmer. Er hat die SSOM und die Schweiz in verschiedenen Disziplinen oft sehr kompetent vertreten. Unvergesslich die Gespräche mit Wilfried über „Gott und die Welt“, seine Liebe zur Natur und zur „Mitwelt“. Wir trauern um einen lebenswerten Freund!

Roland Wessicken und Richard Guggenheim

SSOM Agenda 2004

Veranstaltung	Ort	Datum	Bemerkungen
SSOM Vorstandssitzung	Bern	14. Januar	
SAOG/GSSI Meeting	Fribourg	23. Januar	"New trends in surface science"
EOS topical meeting	Engelberg	21. - 23. April	Optics in Computing
13 th European Microscopy Congress EMC 2004	Antwerpen Belgien	22. – 27. Aug.	
Sektion Optik	Zurich	1. Oktober	Sektionstagung at Bookham
Sektion Mikroskopie			Sektionstagung
Sektion Nanotechnik			Sektionstagung
SANW / ASSN	Sarnen - Stans	7./8. Oktober	Jahreskongress / Congrès annuel "Limits '04"
SATW	EPFL	30. September	Jahreskongress "Nachhaltige Energieversorgung"

In 2004 there will be no General Assembly of the SSOM but the sections will meet individually

Courses and Conferences 2004-2005

March 2004

- 7 - 11 **Nanotech 2004**
Boston, USA
www.nanotech2004.com
- 17 - 19 **Nano Tech 2004**
Tokyo, Japan
www.ics-inc.co.jp/nanotech/index_e.html

April 2004

- 21-23 **Optics in Computing**
EOS Topical Meeting
Engelberg, Switzerland
www.eos.org
- 26 - 30 **Photonics Europe 2004**
Strasbourg, FRANCE
Krisinda Plenkovich, (360) 676-3290 ext 253, media@spie.org
www.spie.org

May 2004

- 26 - 28 **Nanotrends 2004**
München, Germany
www.iir-germany.com/nanotrends/

July 2004

- 12 – 15 **ICO'04**
Optics & Photonics in Technology Frontier
Makuhari Mess, Chiba, Japan
www.ico-odf04.com

August 2004

- 9 - 20 Basiskurs Mikroskopie, Praktischer Kurs in Mikroskopie
Biozentrum / Pharmazentrum der Universität Basel
- 22 – 27 **EMC 2004**
13th European Microscopy Congress, Antwerp, Belgium,
information@emc2004.be, www.emc2004.be/
- 20 – 2 Sept **Microscopy Congress**
Dreiländertagung Mikroskopie
Kongresszentrum Davos, Switzerland

September 2004

1 – 3 **MOC'04 Microoptics Conference**
Friedrich-Schiller-University Jena, Germany
www.moc04-jena.org

14 - 16 **Nanofair**
St. Gallen
www.nanofair.ch

19 - 22 **MNE 2004**
Micro and Nano- Engineering
Rotterdam, The Netherlands
www.mne04.org

October 2004

10 – 14 **Frontiers in Optics 2004**
OSA Annual Meeting

Collocated with
- Diffractive Optics and Micro-Optics (DOMO) 2004
- Optical Fabrication and Testing (OF&T) 2004
www.osa.org/meetings/annual/

November 2004

23 - 24 **FSRM course**
"Nanotechnology - Imaging and Engineering at the Nanoscale"
Rome, Italy
www.fsrn.ch/doc/c65.asp

March 2005

7 - 10 **The SSOM Engelberg Lectures on Optics 2005**
"Biomedical Photonics"
Hotel Regina Titlis, Engelberg

August 2005

20 – 2 Sept **Microscopy Congress**
Dreiländertagung Mikroskopie
Kongresszentrum Davos, Switzerland

See also according pages on
www.ssom.ch
and
www.nanoscience.ch/events.asp
for further events



Swiss Society for Optics and Microscopy

Société Suisse pour l'Optique et la Microscopie

Schweizerische Gesellschaft für Optik und Mikroskopie

Anmeldung zur Mitgliedschaft / Demande d'Adhésion :.....
Adressänderung / Changement d'Adresse:

Name/Nom :

Vorname/Prénom :

Institut/Firma/Institution :

Adresse :

PLZ/Code Postal : Ort/Lieu :

Telephon : Fax :

E-mail :

Mitgliedschaft in Sektion / Demande d'adhésion en section

Optik / Optique Mikroskopie / Microscopie Nanotechnologie

Jahresbeiträge als / Cotisations annuelles (Zutreffendes bitte ankreuzen)

..... Einzelmitglied / Membre individuel : **Fr. 30.-** (Optik neu **Fr. 42.50**)

..... Kollektivmitglied / Membre collectif : **Fr. 150.-**

Haupt-Delegierter / Délégué principal :

Kollektivmitglieder, Namen und Adressen der Delegierten / Noms et adresses des délégués (max. 10)

.....
.....
.....
.....

Datum / Date :

Unterschrift / Signature :

Bitte Anmeldung an Kassier / A renvoyer au caissier svp :

Marcel Duggelin, Universität Basel, Zentrum für Mikroskopie,

Pharmazentrum, Klingelbergstrasse 50, CH-4056 Basel

Tel. (061) 267 14 02, FAX (061) 267 14 10,

Email: marcel.dueggelin@unibas.ch

Redaktion: Dr. Reto Holzner
Apfelbaumstrasse 2
8050 Zürich

Tel. 01 312 15 63
reto.holzner@hispeed.ch

Adressänderungen : Bitte direkt an Marcel Düggin
mit umseitigem Formular.

Redaktionsschluss : 15. Februar, 15. Mai, 15. August, 15. November

Die SSOM ist Mitglied bei der

Schweizerischen Akademie der Naturwissenschaften (SANW)
Schweizerischen Akademie der Technischen Wissenschaften (SATW)

Druck: Druckerei Dietrich AG, Pfarrgasse 11, 4019 Basel

Der Druck wurde unterstützt von der Schweizerischen
Akademie der Naturwissenschaften SANW

