

The Microbial Taxonomist

A Newsletter Published by Bergey's Manual Trust

Bergey's International Society for Microbial Systematics (BISMis)

Bergey's Manual Trust voted to sponsor an international society for microbial systematics, which will be named Bergey's International Society for Microbial Systematics (BISMis) at its annual meeting in Gothenburg, Sweden in June 2009. The purpose of the society is to promote excellent research in microbial systematics as well as enhance global communication among taxonomists who study the *Bacteria* and *Archaea*. The society will also serve internationally as an advocate for research efforts on microbial systematics and diversity.

The Trust recognizes that the vast diversity of microbial life is the last remaining major reservoir of unknown biological diversity on Earth. A principal goal of the society is to comprehend this vast but largely unstudied diversity with its untapped genetic, enzymatic and industrial potential. A basic aim of the society is to foster efforts to isolate novel microorganisms in pure culture and to describe, name and classify them.

As noted in Volumes 1, 2 and 3 of *The Microbial Taxonomist*, the

Trust has been contemplating whether a society should be formed for several years. To assess the interest of the community of microbial taxonomists in a new society, an online survey was conducted in 2007–2009. Because virtually all respondents favored the organization of an international society for microbial taxonomists, the Trust has initiated this effort.

The Trust is beginning its membership drive with the publication of this newsletter. Members who enroll in 2010 will be considered Charter Members of the society upon payment of dues. Those who wish may purchase (for \$10) a Certificate to acknowledge their charter membership. Annual dues for full membership is US\$50 and for all students it is US\$30. A lifetime membership is being offered for \$500. All members will receive the newsletter and a new online twice-yearly publication, *Bergey's International Society for Microbial Systematics Bulletin*, or *Bergey's Bulletin*.

The first issue of *Bergey's Bulletin* will be published in late 2010. *Bergey's Bulletin* will not

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Michael Goodfellow, *Chair*
Peter Kämpfer, *Vice Chair*
William Whitman, *Treasurer and Director of the Editorial Office*
Fred Rainey, *Secretary*
Jongsik Chun
Paul De Vos

James Staley, *Contributing Editor*
Aidan Parte, *Managing Editor*

publish original research papers but will focus instead on opinion articles, mini-reviews, biographies, autobiographies (by invitation only) and obituaries of noted microbial taxonomists.

The inaugural meeting of the society, in Beijing, China, is currently in the planning stage as is the drafting of the constitution.

Those interested in joining BISMis to become Charter Members should visit the BISMis website at www.bergeys.org/bismis.html or complete and return the form in this newsletter.

KARL HEINZ SCHLEIFER BECOMES EMERITUS TRUSTEE AND RECEIVES BERGEY MEDAL

Karl Heinz Schleifer has contributed in many ways to modern microbiology, most notably by several landmark contributions to molecular taxonomy and ecology. His early work with Otto Kandler dealt with the cell-wall chemistry of Gram-positive bacteria, in particular with the elucidation of the primary structure of peptidoglycan. The review article of 1972 (Schleifer, K.H. and O. Kandler. The peptidoglycan types of bacterial cell walls and their taxonomic implications. *Bacteriol. Rev.* 36, 407–477) has been cited more than 2000 times. After postdoctoral research fellowships at the Rockefeller University and the Medical School of New York University he returned to Munich. In 1974 he was appointed full professor of Microbiology at the Technical University of Munich. He rapidly built a strong department that maintained international leadership for more than 30 years. He was Dean of the Faculty of Chemistry, Biology and Geology from 1986 until 1988.

Karl is famous for his work on the molecular taxonomy, comparative biochemistry and genetics of various Gram-positive bacteria, including staphylococci, micrococci, streptococci, enterococci, lactococci, anaerobic cocci and coryneform bacteria. These studies were carried out in collaboration with colleagues from the US and various European countries. The results led not only to an improved classification and identification of a large number of taxa but also achieved new insights into the chemistry, biochemistry, physiology and genetics of these organisms. In medical microbiology, he is best known for the revision of the genera *Staphylococcus* and *Enterococcus*.

In the early 1980s Karl was among the first to realize the power of comparative sequence analysis of rRNA. His laboratory integrated the 16S rRNA cataloguing developed by Carl Woese into the larger context of bacterial systematics, thereby paving the way to what is known now as polyphasic taxonomy. He had a particular interest in the design and application of nucleic acid probes, first for taxonomic and later for ecological studies. He also initiated comparative sequence analysis of 23S rRNA, β -subunit of ATPase and elongation



factor Tu. The results clearly supported 16S rRNA-based phylogenetic reconstructions.

Based on the stable taxonomic framework provided by rRNA-based analyses and the availability of nucleic acid probes, he aimed at a cultivation-independent identification of single microbial cells. Schleifer's group in Munich developed fluorescence *in situ* hybridization with rRNA-targeted oligo- and polynucleotide probes as a robust method for the quantification of populations in complex microbial communities, an achievement best documented in a second widely cited review (Amann, R., W. Ludwig and K.H. Schleifer. Phylogenetic identification and *in situ* detection of individual microbial cells without cultivation. *Microbiol. Rev.* 59, 143–169, 1995). Schleifer's broad scope encompasses topics as different as bacterial endosymbionts, magnetotactic bacteria, food and waste water microbiology.

Karl and his long-time collaborator Wolfgang Ludwig created ARB, a curated rRNA database and software package. ARB is freely available and has been successfully used by numerous researchers around the world for reconstruction of phylogenetic trees and the design of nucleic acid probes.

More recently Karl became interested in the characterization of tubulin-like genes in bacteria, in particular in members of *Verrucomicrobia* and related organisms. In addition, he has applied multilocus sequence analysis (MLSA) of selected protein-coding genes to improve the classification of staphylococci.

Karl Heinz Schleifer has authored more than 470 publications and in 2001 was ranked number 3 among the most highly cited researchers worldwide. He is currently Editor-in-Chief of *Systematics and Applied Microbiology*. He was one of the co-editors of the 2nd edition of *The Prokaryotes* and is co-editor of the new electronic edition of *The Prokaryotes*.

Karl has advised more than 100 PhD and about 250 masters degree students and many postdoctoral fellows. Most of them have careers in industry and academia (12 as professors) and are spreading his unique approach to microbiology, which may be best characterized as general in its scope but always grounded in the reliable identification of either pure cultures or specific populations in their natural habitat.

Karl Heinz Schleifer was and still is highly active in various scientific societies and academies. He was Secretary General of the Federation of European Microbiological Societies (FEMS) from 1986 till 1994, president of the German Society for Hygiene and Microbiology (DGHM) from 1989 to 1992, and president of the International Union of

Microbiological Societies (IUMS) from 2005 to 2008. Moreover, he is corresponding member of the Royal Academy of Veterinary Sciences in Madrid (Spain, since 1984) and of the Academy of Sciences in Göttingen (Germany, since 1987) and a full member of the American Academy of Microbiology since 1995.

As a highly recognized scientist and academic teacher Professor Dr Schleifer has received a number of awards and honors: the Körber European Science Award in 1995, the annual award of the Society for Hygiene and Environmental Medicine in 1997, the Ferdinand-Cohn Medal in 2001, the (German) Federal Cross of Merit in 2006, the Emeriti of Excellence Award of the Technical University Munich in 2007, and the FEMS Lwoff Award in 2009.

Karl Heinz Schleifer has served as a member of the Bergey's Manual Trust since 1989. Following his retirement from the Trust in 2009 he received the Bergey Medal in recognition of his many contributions to microbial systematics and his outstanding service to the Trust.

Wolfgang Ludwig

PUBLICATION MATTERS

Volume 3 (*The Firmicutes*) was published in September, a major milestone for the Trust since its move to the University of Georgia, Athens. There was a well-attended prelaunch reception at the Springer booth at the FEMS Gothenburg meeting (*right*). The latest sales figures are looking good at 582 for the US and 1777 for the Rest of World.

The complete content for Volume 4, excepting the front matter and index, was sent to Springer for typesetting on 12 February. We were pleased to be able to include the *Tenericutes* (*Mollicutes*) after a huge effort by editor Daniel Brown and the mollicutes community in preparing updated material for publication. Other phyla included in this volume are the *Bacteroidetes*, *Spirochaetes*, *Acidobacteria*, *Fibrobacteres*, *Fusobacteria*, *Dictyoglomi*, *Gemmatimonadetes*, *Lentisphaerae*, *Verrucomicrobia*, *Chlamydiae*, and *Planctomycetes*.



We will be in contact with authors regarding proofing arrangements, missing copyright and permissions, and details for the list of contributors in due course.

Volume 5 (*Actinobacteria*) is approximately one-third copy-edited, and the bulk of the content has been accepted. We are aiming to get this volume published in early 2011. All in all, it looks like we have a very busy year ahead.

Aidan Parte, Managing Editor

BUSSE BAGS BERGEY'S AWARD

The Bergey's-Springer Award has been presented annually since 1979 in recognition of outstanding contributions to the systematics and taxonomy of prokaryotes. In addition to a cash prize of US\$2000, the award includes travel to a meeting of the awardee's choice. At its annual meeting, the Bergey's Manual Trust voted to present the Award for 2008 to Dr Hans-Jürgen Busse of the Institut fuer Bacteriology, Mycology & Hygiene at the Veterinary University Vienna (Austria).

Dr Busse received his PhD degree from the University of Hannover, Germany in 1989 with a thesis entitled "Chemotaxonomic and phylogenetic characterization of xenobiotic-degrading Gram-negative bacteria". From 1991 to 1997 he had a postdoctoral position at the Institute of Microbiology and Genetics, University of Vienna, where he set up a research group on Bacterial Systematics. His main



interest lies in the taxonomy of various Gram-negative and Gram-positive bacteria with the emphasis on chemotaxonomic traits. One of his major contributions to taxonomy was the discovery that polyamine patterns for various taxonomic groups were congruent with the groupings based on 16S rRNA gene sequence analyses. From 1997 up to now, Dr Busse has held the position of Senior Scientist at the Institute of Bacteriology, Mycology and

Hygiene, Veterinary University, Vienna, Austria. From 1999 until 2000, he was visiting professor at the University of Salzburg, Austria. Since 1994, Dr Busse has been a member of the International Committee on the Systematics of Prokaryotes (or ICSP) Subcommittee on the Taxonomy of *Pasteurellaceae* and Related Organisms. Since 1996, he has been a member of the ICSP Subcommittee on the Taxonomy of the Genus *Bacillus* and Related Organisms. Since 1999, Dr Busse has been an associate editor of the *International Journal of Systematic and Evolutionary Microbiology*, the publication of the ICSP. Since 2005, he has been the Vice-Chairman of the ICSP, and he is also an editor for Volume 5 of *Bergey's Manual*.

Peter Kämpfer

REQUEST FOR NOMINATIONS FOR THE BERGEY AWARD

Nominations are sought for the 2011 Bergey Award which will be presented at the first meeting of the Bergey's International Society of Microbial Systematics in China in 2011.

The Award was initiated in 1979 to honor an individual for outstanding contributions to microbial taxonomy. The Award, donated by

the Board of Trustees of Bergey's Manual Trust and Springer, consists of a certificate, a \$2000 prize and expenses for travel to receive the Award at the society meeting. Previous winners of the Bergey Award are listed at the Bergey's website. Nominations in the form of a letter of nomination and a CV of the nominee should be forwarded to bergeys@uga.edu by 1 May 2010.

IMPORTANT DECISIONS MADE IN GOTHENBURG

Last year the annual meeting of Bergey's Manual Trust was held in Gothenburg, Sweden on June 17 and 18. In attendance were all of the trustees (Goodfellow, Rainey, Schleifer, De Vos and Whitman), Jim Staley (Emeritus Member), four associates (Brown, Busse, Ludwig, Trujillo and Wade), an invited guest (Jongsik Chun) and Aidan Parte, our Managing Editor. In addition to the usual business, such as reports from the Secretary, Treasurer and Managing Editor, the focus was on how to promote the mission of BMT in a rapidly changing environment that was being shaped by technological developments and changes in the work patterns of academics. Two issues were considered within this context, namely whether, and if so how, to move towards generating electronic editions of *Bergey's Manual* and secondly what should be the nature of the content of the 3rd edition.

Fred Rainey presented a strong case for moving to publishing *Bergey's Manual* in an electronic format based on an excellent position paper he had written on this issue for the meeting. The thrust of Fred's argument was accepted unanimously without debate, thereby paving the way for a discussion on how the desired objective could be achieved. The outcome was to seek proposals from publishers and other prospective parties on how our plans for electronic publications might be realized. The prospect of getting volumes 1–5 of the present edition published electronically was also considered.

The prospective structure and content of the next edition of *Bergey's Manual* provoked a lively exchange of views. Some considered that the 3rd edition should only include taxonomic and systematic material relevant for identification purposes while others saw the need to include information on the biology of the organisms. It was eventually agreed that "the content of a chapter should be information on the taxonomy and systematics of the group of organisms under consideration. Additional information should be relevant to the taxonomy and systematics of that group of organisms".

Trustees have been concerned for sometime about the decline in the standing of microbial systematics in

many parts of the world, a issue that is highly relevant to the mission of BMT. Jim Staley presented a very useful paper on how this issue might be addressed through the mediacy of a new international society. The trustees agreed unanimously to "authorize Staley to form a microbial taxonomy society" and "to name the society Bergey's International Society for Microbial Systematics (BISMis)".

Trustees were also of the view that it is vitally important to promote effective communication on taxonomic matters with the scientific community, not least with colleagues who write chapters for the *Manual*. Jim Staley raised the idea of having an online bulletin containing review articles, opinion pieces and biographies of noted systematists. The bulletin, which would be published twice yearly, could be put on the website of the new society and would only be accessible by members of the society. It was agreed unanimously "to in principle allow the society to publish a bulletin and to permit Staley to solicit articles for the first issue of the bulletin". It was agreed that Jim would lead on this new initiative and that trustees and associate members from the editorial board.

The need to generate additional income streams to realize the new objectives of BMT was also a hot topic at the meeting. Several proposals for raising income were discussed at some length. The following motions were accepted unanimously:

(a) "that Whitman raise the issue of publishing a new edition of *Bergey's Manual of Determinative Bacteriology* with prospective publishers.

(b) "to go forward with exploring and produce a sample document of a Skerman-type volume which focuses on the description of bacterial and archaeal genera".

It was also agreed that the Bergey Award, which is currently made annually, should be presented at meetings of the international society, these are likely to be held every 2–3 years. It was also agreed unanimously that nominations for the Bergey Award be sought through the Newsletter. The trustees were also at one in agreeing that the Bergey Medal for 2009 be awarded to Erko Stackebrandt in recognition of his remarkable contributions to microbial systematics. A

biography for Erko will appear in a future issue of *The Microbial Taxonomist*.

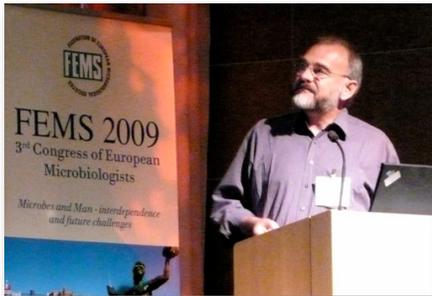
The trustees agreed that in light of the current strategy, not least the move towards electronic publishing, it was important that new members of BMT should bring vitally needed skills in addition to their excellence as microbial systematists. Indeed, with this in mind it was agreed unanimously that

Jongsik Chun be invited to become a member of BMT. Warm tributes were paid to Karl Schleifer who was retiring as a trustee. However, the hope was expressed that Karl would continue to help further our future activities in his new capacity as an Emeritus Member of the Trust.

The next annual meeting of BMT will be held in Seville, Spain on 11 & 12 May 2010.

HIGHER TAXA OF PROKARYOTES

Bergey's Manual Trust sponsored a session entitled "Defining Phyla Within Prokaryotes" at the FEMS meeting in Gothenburg, Sweden in June 2009. The session conveners were **William Whitman** (University of Georgia, Athens, USA) and **Paul De Vos** (Universiteit Gent, Belgium). In the morning, four speakers reflected on their experiences on defining or describing prokaryotic phyla.



Wolfgang Ludwig (*above*) (Technische Universität München Friesing, Germany) addressed the topic of assessing the phylogeny of the higher taxonomic groups using 16S rRNA gene sequences as well as other highly conserved genes, such as those encoding the large subunit of rRNA, elongation factors, heat-shock proteins,

recA, and ATPases. He indicated that trees generated by 16S rRNA sequences were very well supported by trees of other conserved genes. While any single gene tree might be misleading for a particular higher taxon, the consensus trees were very reliable.

Kostas Konstantinidis (Georgia Institute of Technology, USA) spoke about the value of complete genome sequences in taxonomy and illustrated the utility of genomic information for assessing bacterial taxonomy at lower taxonomic levels. However, he indicated that the genomic information is not always helpful at higher taxonomic levels because only a relatively few highly conserved genes and proteins, as discussed by Ludwig, provide sufficient resolution at the higher levels.

Céline Brochier (Université de Provence, Marseille, France) raised the issue of why there are so few phyla of the *Archaea* in comparison with the *Bacteria*. Based on data she provided, she suggested that, indeed, several archaeal groups, such as the orders *Methanococcales* and *Methanobacteriales*, are sufficiently distinct to be considered new phyla.

Satoshi Hanada (*below*)

[National Institute of Advanced Industrial Science and Technology (AIST) Tsukuba, Ibaraki, Japan] described how he isolated a bacterium he named *Gemmatimonas aurantiaca*, which



is a member of a phylum that was previously known only from sequences of environmental 16S rRNA gene clones. He isolated a strain of the "BD group", one of the many unnamed "divisions" that are common in environmental clone libraries, from a laboratory wastewater treatment reactor. From this single strain he was able to describe a new species and genus as well as a phylum (*Gemmatimonadetes*).

After lunch, the speakers were joined by **Peter Kämpfer** (Justus-Liebig-Universität Giessen, Germany) and **Ramon Rosselló-Mora** (Institut Mediterrani d'Estudis Avançats,

Illes Balears, Spain) for a lively roundtable discussion, with incisive questioning from **Brian Tindall** of the DSMZ among others. Dr Whitman asked the roundtable and audience to address four hypothetical questions:

1. Some very distinctive organisms are formed by reduction of the genome. Are they novel phyla?

2. Lineages might be formed by fusion of the genomes from two phyla. Do they represent a new phylum?

3. Two ancient lineages are phylogenetically distinct but very



similar phenotypically. Are they phyla?

4. A phylogenetically unique lineage is discovered, but it is not diverse. Is it a phylum?

Roundtable participants were (from left to right) Paul De Vos, Satoshi Hanada, Wolfgang Ludwig, Kostas Konstantinidis, Peter Kämpfer, Céline Brochier, Ramon Rosselló-Mora and Barny Whitman (standing).

NEW MEMBER OF BMT: JONGSIK CHUN

Jongsik Chun is Professor in Bacteriology and Bioinformatics at Seoul National University. He is best known for his contributions to microbial systematics, bioinformatics, ecology and genomics and has published over 110 original research articles in these fields. His laboratory maintains a web-based bioinformatics service for 16S rRNA-based bacterial identification called EzTaxon (<http://eztaxon.org/>). This server has been cited in well over 100 publications and has more than 2000 users worldwide who have carried out over 200,000 identifications. Jongsik is an associate editor of the *International Journal of Systematic and Evolutionary Microbiology* and also serves on the editorial boards of



Antonie van Leeuwenhoek and *Microbes and Environments*. He is also an active member of the International Committee of Systematic Bacteriology of the International Union of Microbiological Societies.

Jongsik's current research interests are focused on the application of the next generation DNA sequencing technologies, namely the Roche 454 and Illumina Genetic Analyzer platforms, to genomics, metagenomics and to the development of bioinformatic software and databases for the

identification and detection of pathogenic microorganisms and the human microbiome. He is currently the Director of the Institute of Microbiology at Seoul National University.

Jongsik was born and raised in Seoul and gained a BSc in Microbiology from Seoul National University. He was awarded a PhD in Bacteriology/Bioinformatics under the supervision of Mike Goodfellow at Newcastle University, Newcastle upon Tyne, UK. He worked as a postdoctoral fellow with Yung-Chil Hah at Seoul National University, then with Rita R. Colwell at the Center for Marine Biotechnology at the University of Maryland Biotechnology Institute in Baltimore before returning to Korea working as a Senior Researcher at the Korea Research Institute of Bioscience & Biotechnology in Daejeon. He became a faculty member at Seoul National University in 2000.

Bergey's International Society for Microbial Systematics (BISMiS)

Full Membership Application Form

The Society invites applications for full membership from any person who is interested in the subject of microbial systematics and holds a bachelor's degree in microbiology or a related subject.

The annual dues are US\$ 50.00. Members are entitled to receive the online *International Society for Microbial Systematics Bulletin*, which is published twice a year beginning in Fall 2010, and the online Bergey's Manual Trust Newsletter. Full members will also receive a reduced registration fee for attendance of meetings.

Memberships will be renewed on 1 January of each year. Unless indicated otherwise, applications received before 1 November will be credited to the current year. Applications received after 1 November will become effective the following year. Return the form with payment to: **BISMiS, Bergey's Manual Trust, 527 Biological Sciences Building, The University of Georgia, Athens, GA 30602-2605, USA.**

Alternatively, please join BISMiS online using our secure credit card facility at www.bergeys.org/bismis.html.

First name: _____ Initial(s): _____ Last name: _____

Title: _____ Email address: _____

Mailing address

Street: _____

City: _____

State and Zip/Post Code: _____

Country: _____

Phone no. incl. Country/Area Code: _____

Highest degree: _____ Year received: _____ Subject: _____

Degree-granting institution: _____

Current position: _____

Applicant's signature: _____

Membership dues (add \$10 for Charter Member Certificate)

Amount paid*

Full member	US\$50.00	_____
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Lifetime	US\$500.00	_____
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Institutional	US\$1000.00	_____
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*Credit card no.: _____ Name on card: _____

Card type: _____ Expiry date (mm/yy): _____ Card ID (CVV2/CID) no.: _____

Checks in US\$ should be made payable to: Treasurer, Bergey's International Society for Microbial Systematics.

Bergey's International Society for Microbial Systematics (BISMiS)

Student Membership Application Form

The Society invites applications for student membership from any person who is interested in the subject of microbial systematics and is enrolled as an undergraduate or graduate student in microbiology or a related subject.

The annual dues are US\$ 30.00. Student members will receive the online *International Society for Microbial Systematics Bulletin*, which is published twice a year beginning in Fall 2010, and the online Bergey's Manual Trust Newsletter. Student members will also receive a reduced registration fee for

attendance of meetings. Memberships will be renewed on 1 January of each year. Unless indicated otherwise, applications received before 1 November will be credited to the current year. Applications received after 1 November will become effective the following year. Return the form with payment to: **BISMiS, Bergey's Manual Trust, 527 Biological Sciences Building, The University of Georgia, Athens, GA 30602-2605, USA.**

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First name: _____ Initial(s): _____ Last name: _____

Title: _____ Email address: _____

Mailing address

Street: _____

City: _____

State and Zip/Post Code: _____

Country: _____

Phone no. incl. Country/Area Code: _____

Degree in progress (BS, BA, MS or PhD, etc): _____ Subject: _____

Degree-granting institution: _____

Head of Department*: _____

**Head must write a brief supporting letter verifying that the student is in their department, and it must accompany the application. For online applications, please send letter to the address above or by email to bergeys@uga.edu.*

Applicant's signature: _____

Membership dues (add \$10 for Charter Member Certificate)

Amount paid**

Student member

US\$30.00

**Credit card no.: _____ Name on card: _____

Card type: _____ Expiry date (mm/yy): _____ Card ID (CVV2/CID) no.: _____

Checks in US\$ should be made payable to: Treasurer, Bergey's International Society for Microbial Systematics.