

Journal of Packaging Technology and Research

A SYNOPSIS



Released at the
Closing Ceremony
of the Golden
Jubilee Year of
Indian Institute of
Packaging

14th May, 2016

Mumbai, India

ABOUT INDIAN INSTITUTE OF PACKAGING

The Indian Institute of Packaging is an apex body of the packaging industries in India. Ceaselessly working since last 50 years with the active support of packaging and allied industries and Ministry of Commerce and Industry, Govt. of India, the Institute is now geared up and dedicated to serve the nation and the industry to achieve glory and greater excellence in packaging. The facilities and services offered by the Institute are aimed at making existing modes of packaging perform better and developing new packaging to meet the demands of present and new markets. The diversified activities of the Institute encompass the entire spectrum of the packaging including Research, Development, Education, Training, Testing, Information, Exhibitions, Design, Publication, Library and Data Base Services.

The Institute is closely linked with International Organizations like World Packaging Organization (WPO) and Asian Packaging Federation (APF). The services are recognized by the UNIDO (United Nations Industrial Development Organization) and ITC (International Trade Centre), the Commonwealth Fund for Technical Co-operation (CFTC) and the European Economic Community (EEC).

The Head Office at Mumbai and the Four branches of the Institute at Delhi, Kolkata, Chennai and Hyderabad are also equipped to conduct packaging education, research and export promotion. Recently, Bangalore Branch of the Institute was opened and extension of branch services at Guwahati is soon to commence in a move to reach out to a greater number of industries and organizations across the country.

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B. N. Suresh

Hon'ble Distinguished Professor
Indian Space Research Organisation
Head Quarters (ISRO) Former Director
Vikram Sarabhai Space Centre,
Thiruvananthapuram, India

FOREWARD

It is heartening to learn that the Indian Institute of Packaging will be launching a special issue of the Journal of Packaging Technology and Research (JPTR) during the grand finale of its Golden Jubilee Celebrations on 14th May 2016.

Packaging is an important ingredient for manufacturing, logistics, marketing, and even disposal. It is also an integral part of everyday life. Packaging has revolutionized the total industry whether it is foods, beverages, FMCG, healthcare, pharmaceuticals and even advanced technology elements needed for defense, atomic energy and space.

I am confident that the Journal of Packaging Technology & Research (JPTR) probably the first research journal in the Asian region would become an ideal media for exchange of scientific information on various innovations in packaging technology. Moreover, it would also act as an excellent platform for the rapid dissemination of high quality research papers on various aspects of Packaging which certainly helps the modern world to meet the challenges of the 21st century and to capitalize on the promises ahead.

I congratulate the institute in their noble endeavor in bringing out an international journal in Packaging and convey my best wishes for the grand success of this journal in promoting the packaging sector.

I also wish that the grand Finale of the Golden Jubilee celebrations of the institute to be a big success and earnestly hope that all participating delegates would benefit by mutual discussions and exchange of useful information.





Susan E. Selke
Director & Professor
School of Packaging,
Michigan State University, USA

MESSAGE

I am delighted to convey my congratulations at the launch of the Journal of Packaging Technology and Research (JPTR). The discipline of packaging has come a long way since the first university-based educational program in packaging was founded at Michigan State University in 1952. The Indian Institute of Packaging is now celebrating 50 years of packaging education, and the founding of this international journal is a wonderful way to celebrate this important milestone.

Suitable packaging systems are key to the ability to provide people (and businesses) with the products they need. Well-designed packaging systems can minimize food loss while maintaining food safety and permit food products to enter international trade, as well as meet domestic needs. But packaging is for more than just food. Almost every product that is produced uses packaging at some point in its life cycle.

This new journal will help advance the science behind packaging and communicate the knowledge generated to those who can use it. There are very few journals in the world that focus specifically on packaging, so this is a particularly important new venture.

Again, my congratulations!





A. K. Ghosh

Professor & Head

Center for Polymer Science & Engineering,
Indian Institute of Technology, Delhi, India

MESSAGE

It is with much joy and enthusiasm that we celebrate the launch of Journal of Packaging Technology and Research on the Golden Jubilee Year of Indian Institute of Packaging.

Journal of Packaging Technology and Research (JPTR), a peer-reviewed journal, is dedicated to rapid dissemination of high quality research about advances in technology and design involving multi-disciplinary areas of packaging. The journal aims in publishing original research, review articles, IPR information and case studies related to all aspects of packaging, including, but not limited to, technology, materials, equipment, and design. The journal lays a special emphasis on sustainable packaging and the packaging needs of emerging economies.

I am extremely proud of our editorial board members and feel fortunate to be able to draw upon their individual and collective knowledge, judgment, and disciplinary backgrounds to advance JPTR worldwide. I look forward to our journey together as we develop JPTR into its fullest potential.

Finally, we wish to encourage contributions from the scientific community and industry practitioners to ensure a continued success of the journal.





N. C. Saha

Director

Indian Institute of Packaging, India

EDITORIAL

It is my great privilege to present this 'Synopsis' of the proposed Journal of Packaging Technology and Research (JPTR) which will be released on 14th May, 2016 to commemorate the closing ceremony of the Golden Jubilee Celebrations of the Indian Institute of Packaging, the flagship institute of the Ministry of Commerce & Industry, Government of India for packaging solutions and education.

Over the last 50 years, the Institute is engaged in activities relating to testing and certification of packaging materials and packages for domestic and export markets, consultancy, short-term and long-term training and educational programmes.

Lately, the activities of the Institute have been reviewed with a view to upgrade the educational content with a special thrust on strengthening the domain focused R&D activities in packaging.

In order to fulfill this objective, the Institute has taken this initiative to bring out a Journal of Packaging Technology and Research (JPTR) which will be published by Springer Publishing Company, the global leader in e-journals. This shall be a peer reviewed international journal in packaging and shall be published on a quarterly basis from 2017. Prior to that, the Springer has agreed to bring out two special issues during 2016; the book in your hands is the 'Synopsis' to provide you with an introduction to this journal.

The Journal of Packaging Technology and Research (JPTR) aims at publishing original, high quality research papers, reviews, research articles and IPR [patent] related notes on packaging science and technology to highlight technological and design advancements in packaging. It will also provide an international platform for academicians, researchers and students globally, to access and share their research outcome.

The JPTR would cover various aspects of packaging like functional properties and related applications of different packaging materials for food, pharmaceuticals, cosmetics, consumables and goods requiring protection and communication; packaging constituents elaboration like bio-sourced and waste-sourced molecules, polymers, bio-polymers, composites with natural fibre materials, metal, glass, additives, ink and adhesives, coatings etc.; associated processes (chemistry and characterisation), electronic packaging, transport packaging, corrugated packaging, packaging engineering, nano-micro structuring, surface treatments (e.g. corona, plasma etc.), blends, composites and multilayered polymeric materials, active packaging, smart and intelligent packaging, innovative design of caps and closures, development and application of ancillary packaging



materials, advancement of printing and design, safety aspects (migration, interactions); shelf-life studies of food, pharmaceuticals and cosmetics; toxicological study (evaluation of heavy metal contents), advancement of packaging machinery (automation, robot technology) and environmental impact (sustainability, life-cycle analysis, recycling, incineration, biodegradability, food waste reduction); regulatory aspects like labelling and marking, consumer communication; other aspects like perception, communication, convenience, logistic and supply chain management and socio- economic aspects like economic, legal judgments, decision making experiments, simulation studies etc.

Finally, I take this opportunity to express my sincere thanks and gratitude to the galaxy of globally recognised scientists, academicians and researchers in the field of packaging who have given their consent to be on the editorial board of this journal. I am confident that their contribution by way of advice and help in reviewing the print material will help the Team-IIP in upgrading the standard of this journal and maintain its reputation.



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Professor & Head

Center for Polymer Science & Engineering,

Indian Institute of Technology, Delhi, India



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Senior Vice President

Reliance Innovation Center, Mumbai, India



PROFILES







PROFILE

N. C. Saha is an internationally acclaimed professional in the field of packaging science & technology. Basically a food technologist with Master's from Central Food Technological Research Institute (CFTRI), Mysore; he joined the Indian Institute of Packaging (IIP), an autonomous body under the Ministry of Commerce & Industry, Government of India, in 1987 as a Professor and Scientist. In 1988, he was admitted to the School of Packaging, Michigan State University, USA for Advanced Programme in Food Packaging as a UNDP Fellow. In 1998, he enrolled with the University of Tehran for an Advanced Programme in Productivity Concepts and Tools as a Fellow of Asian Productivity Organisation (APO). North Maharashtra University awarded him Ph.D. degree in Packaging Management for development of the '5D' model of packaging and its synergy on marketing of consumer goods. He is a certified Quality Manager for NABL accredited laboratory as ISO/IEC: 17025:2005. He is a Consultant in package design and formulation of packaging specifications as well as research on shelf-life studies of food products.

Editor-in-Chief



N. C. Saha

Director

Indian Institute of Packaging, India

Having handled multiple jobs of teaching, testing, certification of packages and consultancies as a Professor and Head for 22 years, Prof. N. C. Saha was elevated to become the Director & Principal Executive Officer of Indian Institute of Packaging in 2009.

In recognition of his expertise in the field of packaging, the world packaging fraternity has entrusted Prof. N. C. Saha with the responsibilities as Secretary General of Asian Packaging Federation (APF) since 2013 and Vice President (Asian Affairs) of World Packaging Organisation (WPO) since 2015.

The Government of India has nominated him as a Board Member in many organisations like Spices Board, APEDA, FDDC, GS1, National Horticultural Board and ICPE. He represents IIP as a member of many Task Force Committees constituted by the different ministries like Ministry of Food Processing industry, Ministry of Chemicals and Petrochemicals, Ministry of Forest & Environment, FSSAI and also the Member Secretary of Standing Advisory Committee (SAC) constituted by the Ministry of Commerce & Industry, Government of India. He has been nominated as a Chairman of nine Sectional Technical Committees of Bureau of Indian Standards (BIS) for the formulation of National Standards in packaging. Prof. N. C. Saha was also nominated as 'Domain Expert' under REACH Mission, implemented by TIFAC, Ministry of Science & Technology, Government of India (2001).



Prof. N. C. Saha is the Visiting Faculty in packaging at a number of Institutes and Universities in India. He has authored four books on, 'Food Packaging' for Indira Gandhi National Open University (IGNOU), an e-book on, 'Packaging of Food Products' for National Science Digital Library of National Institute of Science Communication & Information (NISCAIR under the CSIR); besides contribution of a Chapter on, 'Packaging and Transport of Fragrance' to the Fragrance & Development Centre (FFDC), Government of India.

Prof. N. C. Saha is the Supervisor for Ph.D students in the Department of Printing Engineering, Jadavpur University and Co-guide for M.Tech students at the Centre of Polymer Science & Engineering, IIT, Delhi. He has published 5 research papers in National and International research journals and 225 technical papers in National and International magazines. His research interests include shelf-life studies of food, pharmaceuticals and cosmetics in alternative packaging materials, environmental impact of packaging, sustainability, composites of plastics with natural fibres, package design and development and other areas in packaging. He has a patent to his credit on, 'Concept of Application of Polymeric-based Multilayered Collapsible Tube to Extend Shelf-life of Liquid Jaggery (Nalen Gud)'. He is the Editor of the bimonthly magazine, 'Packaging India' and a Member of the Editorial Boards of many packaging magazines.

He has extensively travelled to over 30 countries for attending various meetings of APF and WPO and also made over 300 technical presentations in many National and International conferences.

PROFILE

Susan E. Selke is a Professor at Michigan State University and Director of the School of Packaging, where she has been a faculty member for 32 years. She received a Distinguished Faculty Award from MSU in 2012. She holds M.S. and Ph.D. degrees in chemical engineering from Michigan State.

Her research interests include environmental impacts of packaging; sustainability; plastics recycling; biodegradable and biobased plastics; composites of plastics with natural fibers; life cycle assessment; nanotechnology and packaging, and other areas. She has authored or coauthored several books on packaging materials and on packaging and environmental issues, as well as over 150 articles and book chapters.

Courses she teaches include plastics packaging, packaging materials, packaging and the environment, stability and recycling of packaging materials, and analytical solutions to packaging design.

Associate
Editor-in-Chief



Susan E. Selke

Director & Professor
School of Packaging,
Michigan State University, USA





PROFILE

A. K. Ghosh is a distinguished and renowned Professor in the field of Polymer Science & Engineering at Indian Institute of Technology Delhi, India. Prof. Ghosh has over 29 years of research and teaching experience. With over 1300 citations, an h-index of 20 (from ISI Web of Science), and 7 patents to his credit. He is known for his accomplishments in the field of Polymer Processing and Rheology, having significantly contributed in the areas of Reactive Processing of Polymer Blends and Alloys, Polymer Packaging and Microcellular Processing of Polymeric Materials.

Prof. Ghosh obtained M.Tech degree in Chemical Engineering from the Indian Institute of Technology, Kanpur, India (1982) and a Ph.D in Chemical Engineering from the State University of New York at Buffalo, NY, USA (1986). He worked as a Post Doctoral Research Fellow at the University of Pittsburgh, USA till 1990 and then joined the Indian Institute of Technology, Delhi in 1991. He is a recipient of Young Alumnus Award of Chemical Engineering Department, Calcutta University and Meritorious Service Award of Indian Plastics Institute, Mumbai, India.

He held the prestigious Reliance Chair Professor at IIT Delhi during 2006-11. He has supervised 22 Ph.D. theses and over 84 M.Tech. theses. For his innovative development of polymeric orthotic knee joints for locomotor disabled people, with successful field trials on 1000 patients, he was conferred the National Award (2015). He is a member of National Academy of Sciences, India, Editorial Board of Journal of Plastics Film & Sheeting and International Journal of Plastics Technology. He is elected as International Representative of the Polymer Processing Society (PPS), Asian Workshop in Polymer Processing (AWPP) and Fellow of Indian Plastics Institute (IPI). He is a recipient of "Teaching Excellence Award" by IIT Delhi in 2015-16.

Associate
Editor-in-Chief



A. K. Ghosh

Professor & Head

Center for Polymer Science & Engineering,
Indian Institute of Technology, Delhi, India





PROFILE

Sanjay Kumar Chattopadhyay obtained his PhD in Chemical Engineering from Indian Institute of Technology Guwahati, M.Tech in Polymer Science and Technology from University of Calcutta, and is currently spearheading the entire Research and Development Division of Indian Institute of Packaging in the capacity of Additional Director and Head.

Prof Chattopadhyay has nearly 30 years' experience and demonstrated ability in managing high class Academic Training, Technology, Research & Development, Administration, & Consultancy Services to industries in the fields of Packaging and Polymer Science & Technology. He has published numerous scientific and research articles in various international and national journals, magazines, and presented papers in various national and International seminars and conferences. He has two book Chapters on 'Testing and Quality Control of Plastics' and 'Application of Plastics in Packaging,' and has guided 10 M.Tech students in completion of their M.Tech thesis work.

Research Areas covered by him are Polymer blends and composites, Smart packaging materials and Sensors, Bio - composites and Bio and Oxo Bio degradable packaging materials, Nanomaterials and Nanocomposites, Radiation cured polymeric blends, Shelf life studies, Package Design etc.

A UNIDO fellow at Deutsches Kunststoff-Institut (DKI), Darmstadt, Germany, Prof. Chattopadhyay has travelled widely in many countries on various international assignments. He has been Member, working group on Quality Assurance/Audit of UTIPEC [Unified traffic & transportation infrastructure (planning and engineering) center] in Delhi Development Authority, Member in more than 10 sectional committees of Bureau of Indian Standards for formulation of national standards for Packaging, Plastics and allied materials and is a Lead auditor, National Accreditation Board for Testing and Calibration Laboratories (NABL), Dept. of Science and Technology, GOI, for laboratory Quality Management System requirements as per ISO/IEC : 17025:2005.

Managing Editor



Sanjay Kumar Chattopadhyay

Additional Director & Head (R&D)

Indian Institute of Packaging, India



PROFILE

Tanweer Alam is working as Joint Director and Regional Head, Indian Institute of Packaging, Delhi. Before Joining IIP, he was Assistant Professor in Banaras Hindu University. He was also associated with AAI- Deemed University, Allahabad.

He was also Visiting Faculty, University of Allahabad & Jiwaji University, Gwalior and Anna University, Chennai. He has been working for last one decade in different Academic Institutions and involved in teaching of Graduate, Post graduate and Ph. D students. His Ph. D research work was on Modified Atmosphere Packaging (MAP) of food products from National Dairy Research Institute, Karnal.

He visited University of Copenhagen, Denmark under faculty exchange programme funded by EU under East West Food Project. He organized several conferences/workshops of national/international stature in different capacities. His area of research is on novel food and Dairy packaging. He has also been associated in establishing Food Packaging Laboratory at NDRI, Karnal and Center of foods Science & Technology in BHU.

Dr. Alam has published more than 100 research and technical papers in high impact referred journals, apart from delivering several invited lectures both in India and abroad. He has also contributed more than 15 book chapters. He is also life member of different Scientific and Academic Journals. He is also reviewer of more than 10 International journals. He has also edited dozens of Proceedings. He is also associate editor of Asian J of Dairy Science and also Editorial board of Processed Food Industry. Recently Dr. Alam received National Fellow Conferred by National Academy of Dairy Science.

Assistant Editor



Tanweer Alam

Associate Professor

Indian Institute of Packaging, India

PROFILE

Ashok Misra is the former Director of IIT Bombay, prior to which he was at IIT Delhi for 23 years and is currently the Chairman Emeritus-India of Intellectual Ventures. He obtained his B.Tech. at IIT Kanpur, M.S. at Tufts University and Ph.D. at University of Massachusetts. He is the Chairman, Board of Governors of IIT Roorkee; Chairman, Standing Committee of the IIT Council; Chairman, JEE Apex Board. He has been on the governing boards of several academic institutions. On the industry side, he is an Independent Director on the Boards of Reliance Industries Ltd.; Jubilant Life Sciences Ltd. and Kirloskar Electric Co. He is on the Advisory Boards of Aditya Birla Private Equity and Lumis Partners. He was earlier Member Board of Directors of National Thermal Power Corporation Ltd., Rashtriya Chemicals & Fertilizers Ltd. and Jubilant Industries Ltd., each for six years.

He has received several awards including Distinguished Alumnus Awards from all his Alma Maters. He is a Fellow of National Academy of Sciences India and was its President from 2006-08, a Fellow of the Indian National Academy of Engineering, Fellow of the Maharashtra Academy of Sciences, Hon. Fellow of the Indian Institute of Chemical Engineers and Hon. Fellow of the Indian Plastics Institute. He is the Founder President of the Polymer Processing Academy and the former President of Society of Polymer Science India & President of Federation of Asian Polymer Societies. He has organized several international/national conferences and short courses. He has guided 22 doctoral & 52 Masters theses, co-authored a book, has 8 patents and over 175 international publications. He is on the editorial board of 3 international and 2 national journals.



Ashok Misra

Chairman

Board of Governors,
IIT Roorkee, India



PROFILE

Born in 1960, Arved Huebler studied Physics in Heidelberg and Berlin. His Ph.D in the field of image science was honoured with several awards. In 1992, Arved Huebler joined the Bertelsmann Group in Guetersloh, Germany, which is one of the largest media companies worldwide. At Bertelsmann, he became Technical Director and was responsible for several main technological projects.

In 1997, he was appointed to a professorship at Chemnitz University of Technology, Germany. He is director of the Institute for Print and Media Technology [pmTUC] at the University with about 60 employees today.

Arved Huebler is a member of various national and international scientific organisations. He has over 100 publications, holds several patents and was chair of several international conferences.

He is member of the board at OEA, the international Organic Electronics Association. Furthermore, he is co-founder and CEO of printed systems GmbH in Chemnitz, a young company focused on printed electronics.



Arved C. Huebler

Professor

Institute of Print and Media
Technology, Germany

PROFILE

Bhesh Bhandari is associated with the University of Queensland for the last 20 years. He obtained his PhD from ENSIA (France) in Food Process Engineering in 1992. He has a major research focus on food materials science including microencapsulation of food ingredients and glass transition related issues in food processing and product systems. Professor Bhandari's current research area also includes the relating the nanostructure of food system to its bulk properties. His past and current researches involve dairy, meat, rice, honey, probiotics, oils, fat etc. Professor Bhandari's research is not commodity focused only. His primary approach to research is applying fundamental science and engineering principles on developing a relationship between process, structure, property and performance of food materials systems. Professor Bhandari has extensively investigated various micro and nano-encapsulation processes such as spray drying, molecular encapsulation, co-crystallisation, precipitation and gel entrapment. Prof. Bhandari has developed a patented continuous method to produce microgel particles that can be used to encapsulate various functional ingredients and pharmaceutical drugs. Prof Bhandari has done a number of pioneering works on stickiness issues of food powders encountered during drying and handling. Recently Professor Bhandari has developed patented technique to produce ethylene powder which can be used for fruit ripening and other plant physiological control. Professor Bhandari has also developed stickiness testing device that enables to measure the stickiness and glass transition temperature of food material by just using texture measuring instruments.

Professor Bhandari successfully completed a collaborative research project with Nong Lam University, in Vietnam on control of rice cracking in Mekong Delta. Professor Bhandari also completed a joint research project with National University of Singapore on glass transition mechanism in starch. In addition Professor Bhandari has also been collaborating his research activities in USA, Ireland, Vietnam, China and France. Professor Bhandari is an Honorary Professor of Jiangnan University, Wuxi, China. Professor Bhandari has been in the organizing committee of several international conferences, including International Drying Symposium, Spray drying Symposium etc. He has addressed several international conferences as a keynote and invited speaker.

Professor Bhandari has been awarded with several ARC-Discovery, ARC-Linkage over the years and ARC-Industrial Transformation Research Hub grant recently. He also won grants from Horticulture Australia, Rural Industries Research and Development Corporation, Dairy Australia, Cooperation for Agriculture and Research Development (CARD funded by AusAID) Program, National Meat Industry Training Advisory Council Limited (MINTRAC), Commercialization Australia and UNIQUEST.



Bhesh Bhandari

Professor and Head
School of Agriculture and
Food Sciences,
University of Queensland,
Brisbane, Australia



PROFILE

A Management Consultant and Packaging Strategy Advisor, Dr. Carl Olsmats is currently Associate Professor of Industrial Engineering and Management at Högskolan Dalarna, Sweden. He had been the past General Secretary of World Packaging Organisation (WPO) for 10 continuous years from January 2002 till December 2011. Dr Carl He has 25+ years experience in packaging including leading positions in research, consultancy and Management at Packforsk and Innventia, as well as a 10 year appointment as General Secretary of WPO. He did his PhD in packaging strategies and foresight.

Carl also currently holds a position as Advisory Vice President at GPC-Global Packaging Center, Hangzhou, China.



Carl Olsmats

Associate Professor
Dalarna University, Sweden

PROFILE

Debabrata Chakrabarty got B. Tech. and M. Tech. degree of the Calcutta University (after completing B.Sc. with honours in Chemistry) securing gold medal. He gained Industrial experience of about 10 years of which 8 years were in packaging field. Prof. Chakrabarty also underwent training on packaging in UK and Germany during 1984 to 1986.

He joined the department of Polymer Science and Technology, Calcutta University (formerly Plastics and Rubber Technology) in 1989 and is still working as senior professor in the department. He was the former Head of the Department of Polymer Science two times in the tenure. Dr. Chakrabarty was selected for Marquist Dictionary "Who's who in the World" in 1991 for contribution in packaging research and academics.

He has published about 100 research papers, all in journals of International repute.

Twelve candidates have completed their Ph.D. degree under his supervision and four more candidates are in queue for the submission of their dissertation. His field of research includes "Polymer blends, IPNs and composites, nanotechnology, Polymer Gels, High performance laminates, nanotechnology and packaging. Prof. Chakrabarty is closely associated with NIRJAF (National Institute of Research in Jute and Allied Fiber Technology) in the process of evaluation of their various projects.



Debabrata Chakrabarty

Professor

Polymer Science & Technology
University of Calcutta, India



PROFILE

Currently Technical Manager, Wells Plastics, working on a diverse range of projects related to applications of masterbatch to film, sheet and moulding.

Involved with both regulatory (ASTM, ESMA, BSi) and political aspects of oxo-biodegradable additive masterbatch and products, both within the UK (Defra) and other countries, and the development of new grades of the Reverte™ range of oxo-biodegradable additives to suit individual applications and new product ranges and materials.

Closely involved with the development of standards for testing and characterizing oxo-biodegradability having sat on the committee for BS8472, also Technical Lead of WK49920 at ASTM revising ASTM D6954-04 (2013) to reflect the knowledge and understanding gained since first approval.

A founder and board member of the Oxo-biodegradable Plastics Federation (OBPF) bringing together leading manufacturers and scientists in oxo-biodegradability to educate and promote the science and technology of these materials.

BSc (Hons) in Materials Science, UMIST and PhD, Loughborough University. Fellow of the Institute of Materials (IOM3), Chartered Scientist (UK Science Council) and Chairman of the Manchester Polymer Group.



Gary Ogden

Director

Wells Plastics, United Kingdom

PROFILE

Gaur G. Ray, Joined the Indian Institute of Technology Bombay as a lecturer in the Industrial Design Centre in the year 1979 and also became the associated faculty of the Department of Biosciences and Bioengineering in the year 1988. He became the Head of the department from 2009 to 2013. Currently he is Ramkrishna Bajaj Chair Professor of the Institute and faculty in-charge of the Ergonomics division of IDC.

He has been invited as visiting faculty and full professor of several Universities India & Abroad. His research interests are in Product Ergonomics, Consumer ergonomics, Agricultural Tools Design/Development, Automobile/Vehicle Ergonomics & Design, Safety and Occupational Health, Product Design/Development for the Special People/Geriatrics populations. Professor Ray has established Academic/ research collaborations between the Industrial Design Centre., IIT Bombay and 1) the IT University, Copenhagen, Denmark, February, 2010. 2) Institute of Ergonomics, TU Darmstadt, Germany, since 2006 - continuing.

Professor Ray is a Member of the IITB Senate since 1995, Honorary Chairman, Ergonomics Section, PGD 15, Bureau of Indian Standards, 2008 – continuing, Honorary member of the Board of Governors, Indian Institute of Packaging, Mumbai, November 2013 - continuing.

He is Member of the Editorial Board, Indian Journal of Physiology & Allied Sciences, Publ. by The Physiology Society of India, was member of the Technical Expert Committee, Science for Equity Empowerment and Development (SEED) Division, Department of Science & Technology, from 2008 to 2011. He was selected as the member of the Expert Committee for Evaluating the All India Coordinated Research Project on Ergonomics, safety and Occupational Health, Indian Council of Agricultural Research, Govt. of India, Delhi, from 2008 - continuing. He was the External Advisor, of the Furniture Division, Godrej & Boyce Mfg. Co. 2001-2004. He was Member of the Technical Expert committee, Science for Equity Empowerment and Development (SEED) Division, Department of Science and Technology (DST), Govt. of India, Delhi, from 2008 to 2011.

Professor G. G. Ray received the Dr. J.N. Maitra Memorial(Gold Medal) Award for contribution in ergonomics, by the Physiological Society of India., Awarded at The Indian Science Congress, Physiology Session, held at Hyderabad, 1998 and also received 4 numbers of Best Research Paper Awards. He has completed twenty two Sponsored projects, and obtained one Product Design Patent. He has six Nos of Design Registrations and applied for two Product Design Patents. He has Publications in 25 International Journals, Presented papers in more than 130 International & National Conferences and, Edited 2 Books and written 2 nos. of different Book Chapters. Professor Ray has Organised 2 International conferences and conducted 23 workshops. He has PhD guided 6 PhDs (Indian), and 1-International as Co-guide. He has also guided more than 40 M. Des. Projects, 5 MTech Projects and more than 10 M.Sc. Thesis. Currently Professor Ray is working on Affordable and Sustainable Product/Tool Design and development for the Bottom of the Social Pyramid.



G. G. Ray

Professor and Head
Indian Design Centre,
Indian Institute of Technology,
Mumbai, India

PROFILE

Indranil Manna, currently the Director of IIT Kanpur, is an educationist and materials engineer with wide ranging research interests covering structure-property correlation and modeling in structural and functional materials including nanometric metals, laser/plasma assisted surface engineering, nano-fluid and bainitic steel.

His work on amorphous Al-alloys, laser surface engineering of steel/Mg/Al alloys, bearing steel and ductile iron and thermal conductivity of nanofluid are highly cited. Before moving to IIT Kanpur, he headed CSIR-CGCRI in Kolkata (2010-2012). Earlier, he taught subjects related to Physical Metallurgy at IIT Kharagpur for 25 years (1985-2010) and is now teaching courses on surface engineering and phase transformation at IIT Kanpur. While serving at IIT Kharagpur, he worked as a guest scientist in different renowned Institutions/Universities abroad like Max Planck Institute at Stuttgart, Technical University of Clausthal, Liverpool University, Nanyang Technological University and University of Ulm.

Prof Manna has over 250 journal publications, supervised 20 PhD theses, completed over Rupees 16 crore worth sponsored research at IIT-Kharagpur during 1990-2008 and received several national/international awards and recognition. He is actively involved in several technology development and national policy initiatives including steering technology development initiative of MHRD called IMPRINT (www.imprint-india.org). Professor Manna is a Fellow of all the national academies of science (INSA, IASc, NASI) and engineering (INAE) in India.

He is a J C Bose Fellow of DST (2012-17) and a recipient of TWAS prize for engineering sciences (2013). He is currently the Vice President of both the Indian Institute of Metals (IIM) and the Indian National Academy of Engineering (INAE). He has recently been made a Fellow of The World Academy of Sciences (TWAS) and a Member of the Asia Pacific Academy of Materials (APAM).



Indranil Manna

Director

Indian Institute of Technology,
Kanpur, India

PROFILE

Jayeeta Mitra is having more than 5 years of teaching and research experience in institutes of high national repute. She has worked in Banaras Hindu University, National Institute of Technology Rourkela and Indian Institute of Technology Kharagpur. Presently she is pursuing research in food packaging and storage at IIT Kharagpur. She is currently working on developing nanocomposite from biopolymer for active packaging of food for enhancement of quality and shelf life.

Dr. Mitra has published many research papers in national and international journals and conferences. She has filed two patents. Dr. Mitra has worked as reviewer for the international journals like Food and Bioprocess Technology, Journal of Food Processing & Technology, Journal of Food Process Engineering, Innovative Food Science and Emerging Technologies.



Jayeeta Mitra

Assistant Professor

Food Engineering Department,
Indian Institute of Technology,
Kharagpur, India



PROFILE

Jay Singh, is a Professor and Packaging Program Director, Cal Poly State University, San Luis Obispo, CA. Jay received his MS and PhD in Packaging Science from Michigan State University. Considered amongst the top experts in the field of distribution packaging globally, Jay has published 2 books, 2 book chapters, 88 peer-reviewed journal manuscripts, 65 manuscripts in conference proceedings and has made 27 trade journal article contributions.

A number of his publications have contributed towards the development and/or amendment of ASTM, DOT, FAA and ISTA packaging test standards. Several of his recent researches have led to innovative packaging designs that have since been implemented in the field.

His expertise includes teaching, training, testing services and contract research in package design, distribution environment measurement and simulation, material and package testing, package design, product-package compatibility and life cycle assessment (LCA). Jay holds 4 packaging related patents.



Jay Singh
Professor and Packaging
Programme Director
Calpoly State University, USA

PROFILE

Jin Kie Shim is a director of Korea Packaging Center in the Korea Institute of Industrial Technology, and President of Asian Packaging Federation, a non-profit organization to enhance cross Asian country co-operation among all packaging-related fields.

He obtained his PhD in industrial chemistry with a concentration in polymer membrane and surface treatment technology from the Hanyang University in South Korea. His research focuses on discovering the new fundamental physical and chemical interactions of film and the surfaces of materials in composite materials.

Dr. Shim's current research explores the functionalization and dispersion of carbon based materials in conventional polymers, ultra-high barrier film, and functional composite materials, and nano-layered films for various innovative packaging applications. Dr. Shim has published more than 45 peer reviewed research papers.



Jin Kie Shim

Director

Korea Packaging Center, Korea



PROFILE

Johannes Bergmair studied food- and biotechnology at the University of Natural Resources and Applied Life Sciences, Vienna (BOKU). He completed his technical master at Institute for Food Technology in the year 1999. His special field within the range of packing is the quality assurance within the Supply chain food ". In this area - apart from numerous publications in magazines – he finished his doctor thesis at Technical University (TU) Vienna in the autumn 2002. Since July 2000 he is employed at OFI Packaging Institute in Vienna, where he fills the position of an institute leader since April 2003.

Dr. Bergmair holds numerous lectures for packaging technology on several Austrian and German universities, works as court expert for packaging and as an auditor for hygiene management in producing packaging materials (e.g. BRC/IoP, ISO 22.000, EN 15593 and FEFCO GMP). Dr. Bergmair is member of the Austrian Standardisation Committee "Packaging" and Austrian Board Member of WPO (World Packaging Organisation) since 2011. Starting with 2014 he has the honour to fulfil the function of a WPO's Vice President for Sustainability and Food Safety.



Johannes Bergmair

Institute Leader

Austrian Research Institute
for Chemistry & Technology,
Austria

PROFILE

Keshavan Niranjana, better known as Niranjana, is the Professor Food Bioprocessing at the University of Reading. He is a chemical engineer by training and a faculty member at University of Reading since October 1989. He is a Fellow of the Institute of Food Science and Technology, the immediate Past President of the International Society of Food Engineering, and an Editor of the Journal of Food Engineering.

Professor Niranjana has a strong track record of original research publications, and he researches in the broad area of food processing/ process engineering for health and environment. His current research projects cover the following areas:

- 1) formation and stability of bubble included foods,
- 2) engineering strategies to lower fat uptake during deep fat frying,
- 3) development of compostable packaging, active or otherwise,
- 4) high pressure processing of foods, and
- 5) processing techniques for separating health positive ingredients.

Professor Niranjana has a number of projects funded externally by the food industry as well as national and international funding agencies. He is passionately committed to the food engineering education, especially to its research and enterprise dimensions.



Keshavan Niranjana

Professor

Food Bioprocessing &
Packaging,
University of Reading,
United Kingdom



PROFILE

Kuruvilla Joseph is Senior Professor and Dean Indian Institute of Space Science and Technology (IIST), Dept. of Space, Govt. of India, Valiyama P.O., Thiruvananthapuram, Kerala State

Post graduate in Chemistry from the Mahatma Gandhi University, Kottayam. Acquired Ph.D from the Regional research Laboratory, CSIR, Thiruvananthapuram, in collaboration with School of Chemical Sciences, Mahatma Gandhi University, Kottayam. Did Post-doctoral programmes at Federal University of Paraiba, Brazil and Swedish Institute of Composites (SICOMP), Sweden. Currently serving as Dean (Student Activities) and Senior Professor, Department of Chemistry, in the Indian Institute of Space Science and Technology (IIST), Department of Space, govt. of India. Adjudged the academic/professional indices H Index 36 and i10 index 105.

He is having 6262 citations, 4 academic text book publications, 5 book chapters and 6 conference proceedings. He has to his credit two patents and 134 publications in international journals. Produced 16 Ph.Ds, guided 18 M.Phil and 6 M.Tech programmes. Areas of expertise in research encompass Nanomaterials and Nanocomposites, Polymer Blends and Composites, Synthesis of polymers from natural resources, green materials and biocomposites, ageing and degradation, and development of biosensors.



Kuruvilla Joseph

Senior Professor

Indian Institute of Space
Science and Technology,
Thiruvananthapuram,
Kerala, India

PROFILE

Nathalie Gontard is a packaging French senior scientist and Research Director at INRA (National Institute for Agronomical Research), France. She is the leader of the research laboratory working on integrated approach of the “packaging/food/processing” system with a focus on bio-materials, eco-design, safety and nanotechnologies. Her previous academic appointments include Professor at the University of Montpellier II and researcher at the CIRAD.

She has a strong international experience on research and was invited Professor at the Kyoto University in 1999 and 2010. As expert on multi-disciplinary and integrated approach, she participated in several national and European research policy development and evaluation missions.

Working in close collaboration with international researchers, Professor Gontard is an active member in her field. She is co-author of more than 100 papers in peer-reviewed journals. She was also the Conference chair of the EFFoST annual congress ‘A lunch box for tomorrow: an interactive combination of integrated analysis and specialized knowledge of food’ in 2012.

Currently, she is the coordinator of the EcoBioCAP EU FP7 (www.ecobiocap.eu) and NextGenPack (www.nextgenpack.eu) projects, expert at the EFSA (European Food Safety Authority) and member of the European Technology Platform “Food for Life” board. She has been leader or participant of more than 50 international (EU and developing countries), national projects, and industries.



Nathalie Gontard

Research Director

National Institute of
Agronomical Research (INRA),
France



PROFILE

Ramani Narayan was named University Distinguished Professor in 2007 by Michigan State University -- the highest honor that can be bestowed on a faculty member; Governor's (State of Michigan) University Award for commercialization excellence; Michigan Green Chemistry Governor's Award for developing biodegradable packaging and insulation foams, 2011; University Distinguished Faculty Award, 2006, Withrow Distinguished Scholar award, 2005; Fulbright Distinguished Lectureship Chair in Science & Technology Management & Commercialization (University of Lisbon; Portugal); DuPont's Packaging Award for excellence in Innovation & Sustainability, 2010 as part of the Coca Cola Plant bottle team, and serve on Coca Cola "Plant bottle" Advisory Board.

Fellow of the U.S. National Academy of Inventors; Fellow of ASTM & ASTM award of merit -- the highest award given by the society to an individual member. First recipient of the William N. Findley Award for "significant contributions to the application of new technologies" from ASTM Committee on Plastics including Award of Excellence.

The James Hammer Memorial Lifetime Achievement Award, 2006 for outstanding leadership, and research accomplishments from the Bio Environmental Polymer Society (BEPS), as well as the first recipient of Life Time Achievement Award, 2010; Research and Commercialization Award sponsored by ICI Americas, Inc. & the National Corn Growers Association.

Professor Narayan is Scientific Chair of the Biodegradable Products Institute (BPI) USA; and convener/technical expert on ISO committees; He has 200 refereed publications, 30 issued patents, and graduated 20 Ph. D and 25 Master's students. He is a successful entrepreneur, having commercialized several bioplastics technologies.



Ramani Narayan
Distinguished Professor
Chemical Engineering &
Materials Science,
Michigan State University, USA

PROFILE

Rekha S. Singhal is a food technologist by training having more than 25 years in teaching and research in this area up to the doctoral level.

She is currently the Dean (Research, Consultancy and Resource Mobilization) at Institute of Chemical Technology, Matunga, and has a rich experience in areas of food science and technology, carbohydrate chemistry and technology, fermentation technology and downstream processing of macromolecules, supercritical carbon dioxide extraction of biomolecules, and chemistry and technology of traditional foods.

She is associated with several organizations in professional capacity as an expert in her field of study, and has also been recognized through several awards and fellowships, most notably being fellow of Maharashtra Academy of Sciences, Association of Food Scientists and Technologists (India), Biotech Research Society of India (BRSI), and most recently Prof. Man Mohan Sharma Award from Marathi Vidnyan Parishad.

She has supervised 28 doctoral and 87 M.Tech students so far. She is author/co-author of 1 book, several book chapters and review papers and more than 275 research papers. Her work is widely cited.



Rekha Singhal

Dean

Institute of Chemical
Technology, Mumbai, India

PROFILE

R.K. Jain holds Ph.D. in pulp & paper. He has more than 35 years of Research & Development experience of working in industry and R&D as well as in academic institutions in the area of Chemical Recovery, Environmental management & Biotechnology, for Pulp, Paper & Packaging Industry.

Working as a Director In-charge at Central Pulp & Paper Research Institute (CPPRI) Saharanpur (Uttar Pradesh).

Nominated as an expert member of various committees of Government & non Government Organisations viz, Department of Biotechnology, Department of Science & Technology, FSSAI, CSIR, MOEF, BEE, BIS & Principle scientific advisor for Green Chemistry Indicative etc.

Awarded with N. N. Mohan Memorial Award for the best research paper in the year 1984, and published more than 120 research papers in National & International Papers and Hold patents & two books to his credit.

Widely travelled to various countries under various programmes connected to UNIDO & International conferences.

Editor-in -chief of Journal on India Pulp & Paper Technical Association (IPPTA).



R. K. Jain

Director

Central Pulp & Paper
Research Institute,
Saharanpur, India

PROFILE

A polymer scientist, teacher and consultant, Sampa Saha is the Assistant Professor of Centre for Polymer Science and Engineering (CPSE) at IIT, Delhi since June, 2015. She has several years of experience in the field of polymer chemistry.

After finishing her PhD from Michigan State University, USA and postdoc from University of Michigan, Ann Arbor, USA, she has worked for companies like BASF, Singapore and Prochem, Singapore as team leader. More than 1 million dollar worth research grant was awarded during her work period in BASF, Singapore.

Her research area spans from biodegradable polymeric particles (multi-layered and multi-compartmental) to polymer brushes. She has several publications in reputed international journals. Most of her publications are in high impact journals. She has also written a book chapter and filed an Indian patent. She emphasizes on multi-disciplinary approach to solve problems and hence believes in strong collaborative efforts.



Sampa Saha

Assistant Professor

Center for Polymer Science &
Engineering,
Indian Institute of Technology,
Delhi, India

PROFILE

Shivshankar Mishra is a senior educationist of the country who is best known for his management theory of SCOTA [Sharing, Caring, Openness, Transparency and Accountability], that is considered a transformational tool for sustainable growth of any organizational system. He holds Ph.D. in Decision Dynamics under Management Science.

Beginning his early career with the Planning Commission in 1966, he soon migrated to the academic world of teaching and research in 1969. He was Dean of the Faculty of Commerce & Management in the University and also the Principal of S.B.College, a reputed post-graduate college at Aurangabad. He was invited to be the Pro-Vice Chancellor of the Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya, a Central University of Languages, Literature and Culture at Wardha [2003-05]. For the past 10 years, he is with the Institute of Hotel Management, Aurangabad (a Taj Group initiative), as Professor Emeritus and its Academic Director.

He was Chairman of the Committee appointed by the HRD Ministry In 1986 to prepare the Status Report on Commerce & Management Education in the country; in which the issue of skill-focus in all curricula was brought up for discussion for the first time. He was the Millennium President of the Indian Commerce Association during 1999-2001.

Dr.Mishra has multi-dimensional interests ranging from languages and culture to circular economics and strategic management. 36 scholars have been awarded Ph.D. under his guidance and he has authored three important books on Decision Dynamics, Communication Dynamics and Ragging in Medical Colleges besides publishing more than 100 research papers.



Shivshankar Mishra

Professor Emeritus

Institute of Hotel Management,
Aurangabad, India

PROFILE

Suprakas Sinha Ray was born in 1973 in India and completed his PhD studies at the University of Calcutta in 2001, and then postdoctoral fellow at Toyota Technological Institute and Laval University studying the structure-property relationship in nanoclay-containing polymer nanocomposites. He started working on fundamental understanding to real applications of polymer-based nanostructured materials when he joined the CSIR as a group leader. These studies advanced and broadened when he appointed as a chief researcher and director of the DST-CSIR National Centre for Nanostructured Materials and growing to the present time with postdoctoral fellows, students, collaborators and industrial partners worldwide. Currently, more than 80 researchers, engineers and technologists are working with him.

Recently, Prof. Ray has been rated as a Top 1% of most impactful and influential scientists (Chemistry, Materials Science and 22 Science disciplines) by Thomson Reuters Essential Science Indicators, 2014. In 2011, he also has been rated as a Top 50 high impact chemist in the world (Feb. 2011, Thomson Reuter, probably youngest researcher in this list, 1.2 mil Chemists). He is one of the most active and highly cited authors (his articles have been cited more than 14700 times, google scholar, h factor 44), in the field of polymer nanocomposite materials and his work has been featured on various international journal cover pages on 14 different occasions.

He is the author of 2 books, co-author of 3 edited books, 15 book chapters on various aspects of polymer-based nano-structured materials & their applications, and author and co-author of 250 articles. He also has 4 patents and 7 new demonstrated technologies shared with colleagues, collaborators and industrial partners.

His team also commercialized 16 different grades of polylactide nanocomposites. Over the last 10 years, 32 PhD/Master students graduated under his direct supervision. Currently, he is serving as an Associate Editor/ Editorial Board member of the RSC Advances, Macromolecular Materials and Engineering, Applied Nanoscience, Journal of Nanoscience and Nanotechnology, International Journal of Plastic Films and Sheeting, Applied Nanoscience, Journal of Nanomaterials, and Heliyon.



Suprakas Sinha Ray
Chief Researcher and Director
DST/CSIR National Centre
for Nanostructured Materials,
Council for Scientific and
Industrial Research,
South Africa



PROFILE

Swati Bandyopadhyay is currently Head of the Department of Printing Engineering Department of Jadavpur University and she is Associate Professor of the Department. She has graduated from Chemical Engineering Department from Jadavpur University in 1987.

She holds Ph. D. in Engineering from the University of Jadavpur in Energy from Biomass. She has got AICTE Career Award for Young Teacher in 2001. Her present cross-disciplinary research concerns Color science, Imaging science, ink technology and Paper Technology.

In 2010, she has been a Visiting Professor at the University Jean Monnet in the Master of Color in Informatics and Media Technology course from April to June, 2010. The objective was to promote teaching and research in Color Imaging and exchange of ideas with the French Professors in this area.

Since 2006, she is the coordinator of the Digital Color Imaging Integrated Research Group funded by the Ministry of Human Resource and Development of India.

She was Indian Coordinator of Indo French Workshop on New perspective on colour and light: science, arts and humanities, India (Jadavpur University), held on 12-13th November, 2015. She has published a number of International conference and journal papers. Now, six scholars are continuing their research in Printing and Packaging area under her supervision.



Swati Bandyopadhyay

Professor & Head

Printing Engineering Division
Jadavpur University,
Kolkata, India

PROFILE

Tunyarut Jinkarn obtained her BS in Packaging Technology from Kasetsart University and also earned her MS in Packaging Science from Rochester Institute of Technology, Rochester, New York, USA. She completed her PhD in Engineering Management from Missouri University of Science and Technology (University of Missouri-Rolla), Missouri, USA.

She joined Kasetsart University since 1995 and is currently the department head at the Department of Packaging and Materials Technology, Faculty of Agro-Industry. Dr. Tunyarut used to work for various companies and organizations such as Weyerhaeuser, USA, The Missouri Enterprise (MEMTC), Missouri, USA and Thai Container Limited (SCG group) Thailand. Dr. Tunyarut specializes in structural design of packaging, packaging process and machinery and packaging management. Moreover, Dr. Tunyarut also performs a lot of her research in surface modification of packaging materials to get different functionality as well as research related to consumer behavior and packaging development.

Dr. Tunyarut is nominated by The Thai Industrial Standards Institute (TISI) to work in WG9 "Packaging – Accessible Design for Packaging", of ISO/TC 122 Packaging as well as in the working groups of ISO/TC122/SC4-Packaging and Environment. She also participated in activities of Asian Packaging Network (APN), a group of packaging researchers in Asia, as a group leader in 2015.



Tunyarut JinKarn

Assistant Professor and Head
Department of Packaging and
Materials Technology,
Kasetsart University, Thailand



PROFILE

Vijay G. Habbu is a BSc in Chemistry and Physics (Bombay University) and textile chemical technologist (UDCT). He then moved to the field of Fibres, Polymers (PhD at the Univ. of Leeds, UK) and Composites (post-doctoral fellow at the Univ. of Illinois at Urbana-Champaign, USA).

He has worked in various environments such as Universities (Bombay Univ. and Univ. of Illinois), Research Institute (National Chemical Laboratory, Pune) and Industry (SG Chemicals, Synergy Polymers and Reliance Industries Ltd.) in a chequered career spanning Research, Technical, QC/QA, Sustainability and Strategy management primarily in the fields of Polymers, plastics and fibres.

After leading several research and technology initiatives as the Chief of R&T at Reliance's Polyester Sector as a Senior Vice President, he is presently heading its Sustainability & compliance initiatives.

A Chartered Colourist and a Management diploma to his credit, he is a member of various professional bodies such as the Society of Dyers & Colourists, Materials Research Society, Society for Surface Science and Technology, Textile Association.

Dr. Habbu has been responsible for several innovations in the field of Polyester. He loves teaching and is a sought-after speaker and is passionate about sustainability in materials, including packaging. He is leading several such initiatives pan-India.



Vijay G. Habbu
Senior Vice President
Reliance Innovation Center,
Mumbai, India





INSTRUCTIONS FOR AUTHORS







TYPES OF PAPERS

Original Papers

The articles discussing complete investigation on a research problem will be published under this category. The publication of a research problem into fragments will not be encouraged. Ordinarily, such articles may have 10 to 40 printed pages. One printed page will have around 550 words on average.

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These articles should be a critical review on any relevant subject of topical interest and should bring the status of the research work done. The articles should be written in a manner to help either in initiating the work in that area or in increasing the comprehension of the current challenges. The articles should be thought provoking and normally contributed by experts in the subject area. These should not be a compilation of literature survey. Ordinarily, the articles in this category are shorter than an Original Paper, but not necessarily.

Technical Notes

The articles on a topic of research with sufficient details on experimental or theoretical part will be published under this category. Normally, Technical Notes will not be longer than 8 printed pages.

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These types of articles briefly summarize findings or outcomes from preliminary work on cutting-edge or emerging research topics, scope of practice-related findings, survey results, etc. These may range in length from 3 to 8 printed pages.

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The articles in this category may be short, but may be even longer, depending on the subject or study.

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Manuscripts should be submitted preferably in Word. One single-column standard Word page corresponds to about 260 to 280 words in double space. Figures and tables need to be considered in terms of equivalent words. Hence, the length of the manuscript should be restricted to the above requirements depending on the type of the paper.

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Submission of a manuscript implies: that the work described has not been published before; that it is not under consideration for publication anywhere else; that its publication has been approved by all co-authors, if any, as well as by the responsible authorities – tacitly or explicitly – at the institute where the work has been carried out. The publisher will not be held legally responsible should there be any claims for compensation.

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The title page should include:

- The name(s) of the author(s)
- A concise and informative title
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Please provide an abstract of 150 to 250 words. The abstract should not contain any undefined abbreviations or unspecified references.

Keywords

Please provide 4 to 6 keywords which can be used for indexing purposes

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- Manuscripts should be submitted in Word.
- The text of a research paper should be divided into Introduction, Materials and Methods, Results, Discussion, Acknowledgements, Conflict of Interest, and References.
- Materials and Methods must include statement of Human and Animal Rights.
- Use a normal, plain font (e.g., 10-point Times Roman) for text.
- Use italics for emphasis.
- Use the automatic page numbering function to number the pages.
- Do not use field functions.
- Use tab stops or other commands for indents, not the space bar.
- Use the table function, not spreadsheets, to make tables.
- Use the equation editor or MathType for equations.
- Save your file in docx format (Word 2007 or higher) or doc format (older Word versions).

- Manuscripts with mathematical content can also be submitted in LaTeX.

Headings

Please use no more than three levels of displayed headings.

Abbreviations

Abbreviations should be defined at first mention and used consistently thereafter.

Footnotes

Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not contain any figures or tables.

Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

Always use footnotes instead of endnotes.

ACKNOWLEDGMENTS

Acknowledgments of people, grants, funds, etc. should be placed in a separate section before the reference list. The names of funding organizations should be written in full.

- Scientific style
- Please always use internationally accepted signs and symbols for units (SI units).
- Nomenclature: Insofar as possible, authors should use systematic names similar to those used by Chemical Abstract Service or IUPAC.

REFERENCES

Reference citations in the text should be identified by numbers in square brackets. Some examples:

- Negotiation research spans many disciplines [3].
- This result was later contradicted by Becker and Seligman [5].
- This effect has been widely studied [1-3, 7].

Reference List

The list of references should only include works that are cited in the text and that have been published or accepted for publication. Personal communications and unpublished works should only be mentioned in the text. Do not use footnotes or endnotes as a substitute for a reference list.

The entries in the list should be numbered consecutively.

Journal Article

Gamelin FX, Baquet G, Berthoin S, Thevenet D, Nourry C, Nottin S, Bosquet L (2009) Effect of high intensity intermittent training on heart rate variability in prepubescent children. *Eur J Appl Physiol* 105:731-738. doi: 10.1007/s00421-008-0955-8

Ideally, the names of all authors should be provided, but the usage of "et al" in long author lists will also be accepted: Smith J, Jones M Jr, Houghton L et al (1999) Future of health insurance. *N Engl J Med* 965:325-329

Article by DOI

Slifka MK, Whitton JL (2000) Clinical implications of dysregulated cytokine production. *J Mol Med*. doi:10.1007/s001090000086

Book

South J, Blass B (2001) The future of modern genomics. Blackwell, London

Book Chapter

Brown B, Aaron M (2001) The politics of nature. In: Smith J (ed) The rise of modern genomics, 3rd edn. Wiley, New York, pp 230-257

Online Document

Cartwright J (2007) Big stars have weather too. IOP Publishing PhysicsWeb. <http://physicsweb.org/articles/news/11/6/16/1>. Accessed 26 June 2007

Dissertation

Trent JW (1975) Experimental acute renal failure. Dissertation, University of California

Always use the standard abbreviation of a journal's name according to the ISSN List of Title Word Abbreviations, see ISSN.org LTWA

If you are unsure, please use the full journal title.

For authors using EndNote, Springer provides an output style that supports the formatting of in-text citations and reference list.

Authors preparing their manuscript in LaTeX can use the bibtex file spbasic.bst which is included in Springer's LaTeX macro package.

Tables

- All tables are to be numbered using Arabic numerals.
- Tables should always be cited in text in consecutive numerical order.
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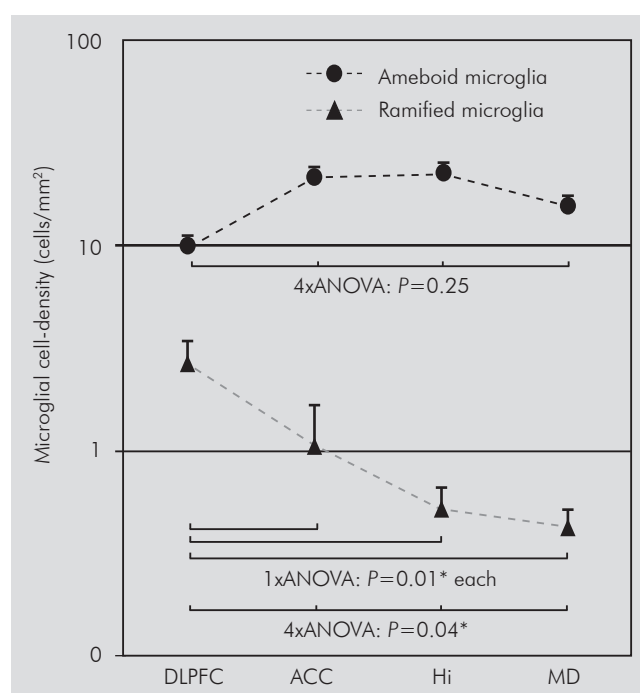
- Identify any previously published material by giving the original source in the form of a reference at the end of the table caption.
- Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data) and included beneath the table body

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For the best quality final product, it is highly recommended that you submit all of your artwork –photographs, line drawings, etc. – in an electronic format. Your art will then be produced to the highest standards with the greatest accuracy to detail. The published work will directly reflect the quality of the artwork provided.

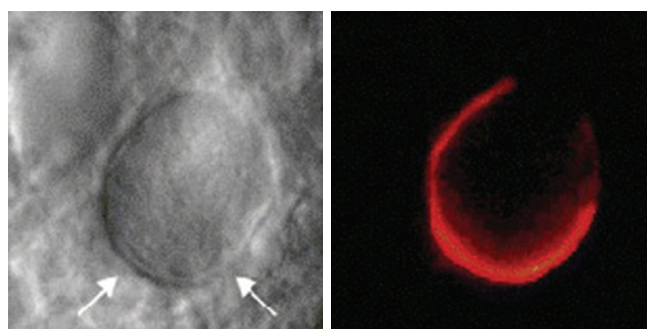
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- Supply all figures electronically.
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- For vector graphics, the preferred format is EPS; for halftones, please use TIFF format. MSOffice files are also acceptable.
- Vector graphics containing fonts must have the fonts embedded in the files.
- Name your figure files with "Fig" and the figure number, e.g., Fig1.eps.



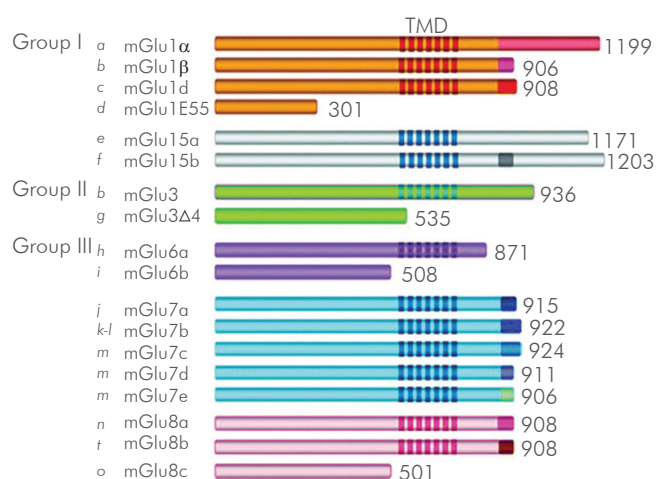
Line Art

- Definition: Black and white graphic with no shading.
- Do not use faint lines and/or lettering and check that all lines and lettering within the figures are legible at final size.
- All lines should be at least 0.1 mm (0.3 pt) wide.
- Scanned line drawings and line drawings in bitmap format should have a minimum resolution of 1200 dpi.
- Vector graphics containing fonts must have the fonts embedded in the files.



Halftone Art

- Definition: Photographs, drawings, or paintings with fine shading, etc.
- If any magnification is used in the photographs, indicate this by using scale bars within the figures themselves.
- Halftones should have a minimum resolution of 300 dpi.



Combination Art

- Definition: a combination of halftone and line art, e.g., halftones containing line drawing, extensive lettering, color diagrams, etc.
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- Color art is free of charge for online publication.
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- Keep lettering consistently sized throughout your final-sized artwork, usually about 2–3 mm (8–12 pt).
- Variance of type size within an illustration should be minimal, e.g., do not use 8-pt type on an axis and 20-pt type for the axis label.
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