



**The International Academy for Production Engineering**

# **NEWSLETTER**

**N° 49 – November 2014**

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# From the President

Dear CIRP colleagues,

It is a great privilege and honor for me to take on the role of the President of CIRP, International Academy of Production Engineering. I wish to thank all the colleagues who have put their confidence in me. My presidency for the year of 2014-2015 started in Nantes, and I would like to start by, on behalf of all of us, expressing our sincere gratitude to Alain Bernard and the French colleagues for organizing and running such an outstanding and impressive General Assembly.



I express thanks to all the past presidents of our Academy, and especially to my predecessor, Laszlo Monostori, who has left the Academy in very good shape, making my transition a smooth one. Since both of us became CIRP Associate Members in a same year, we have been working together on many occasions such as STCs, ICMS, Editorial Committee, Council, and on the Board for almost 25 years. Please accept my gratitude for your leadership, and I hope to be able to rely on your support during the coming period.

Now, let me share with you all my future view for our CIRP. Annals of the CIRP has recently been recognized as one of the top journals with a high IF in the area of manufacturing science and technology. CIRP Annals papers have been frequently cited by outside journals, and are approaching half a million downloads per year. This great success suggests to us that “value” is not “treasure in a box” but it is something that is created through interaction with the outside. Scientific knowledge itself is of little value if it is kept under lock and key in a treasure box. We should therefore strive to have further impact via sharing our collective knowledge with the world by publishing high quality papers. Let us now consider another face of CIRP’s roles. In addition to academic value creation, manufacturing scientists and engineers are becoming increasingly expected to play more essential roles in the development of economic value, and to consider of societal value such as sustainability. This means that CIRP does not exist only for itself, but also exists for society. Our contributions outside our Academy will therefore be of increasing significance.

Last but not least, CIRP will continue to have a successful and active future, with the spirit of friendship, which has always encouraged and made our activities more fruitful. Our Academy provides great opportunities to draw expertise from both academic circles and corporate members from all around the world. Let us work even closer and be the world’s premier driving force for production engineering.

We know also that our academy cannot achieve anything by scientists and engineers alone, and in that respect, we owe sincere thanks to our strong secretarial team, to Didier, Chantal, and Agnes.

I will do my best in serving you in this coming year, and look forward to meeting you in Paris in February 2015!

With friendly and warm regards

Kanji Ueda, President of CIRP

# News about Members

## Professor Jean-Pierre Kruth receives the SME Albert M. Sargent Progress Award



**Professor Jean-Pierre Kruth** has been recognized with the SME Albert M. Sargent Progress Award for original research contributions in different areas of manufacturing science, particularly in additive manufacturing processes and metrology, and for being instrumental in turning these contributions into successful spinoff companies. He is a full professor at the Catholic University of Leuven (Belgium), where he is responsible for production engineering research and education. Kruth's activities involve: CAD/CAPP/CAM, production processes, metalcutting, sheet-metal manufacturing, nontraditional machining (EDM and laser machining), additive manufacturing, reverse engineering, dimensional metrology and QC. After his doctorate, Kruth worked at

the Institut Teknologi Bandung, Indonesia (1979-82) and as engineer and CAD/CAM advisor at the Research Center of the Belgian Metalworking Industry until becoming a professor in 1987. Kruth was elected an SME Fellow in 1997; is a fellow of CIRP (International Academy for Production Engineering); and is a founding board member of the companies Materialise (1990), Metris (1995, now Nikon Metrology) and LayerWise (2008). He was awarded the F.W. Taylor Medal Award (CIRP); the Knight of the Laser Technology Award (Erlangen, D); the Industrial and Academic Career Award in Virtual and Rapid Prototyping (Leiria, Portugal); and FAME Award (Austin, Texas).

## Professor Don A. Lucca received the F. W. Taylor Research Medal



**Don A. Lucca** has been recognized with the SME Frederick W. Taylor Research Medal for fundamental contributions to the research literature and understanding of surface mechanics/surface engineering in manufacturing, nanomechanical behavior of materials and ultra-precision cutting mechanics in precision engineering. Lucca is currently regents professor and Herrington chair in advanced materials in the School of Mechanical and Aerospace Engineering at Oklahoma State University. He also holds the position of guest scientist in the Center for Integrated Nanotechnologies Group in the Materials Physics and Applications Division at Los Alamos National Laboratory. Lucca received a bachelor's degree from Cornell, a master's degree from Princeton and a doctorate from Rensselaer Polytechnic Institute, all in mechanical engineering. His research

is currently directed toward developing basic understanding of the mechanics and physics, which govern microscale and nanoscale fabrication processes used to create ultraprecision surfaces and thin films, and to investigating the mechanical, chemical, electrical and photonic nature of the surfaces which result. Lucca is a fellow of SME, CIRP and ASME. He is a recipient of the Alexander von Humboldt Research Award for Senior Scientists, and has held positions of visiting professor at the Stiftung Institut für Werkstofftechnik at Universität Bremen and at the

Politecnico di Torino. Lucca was awarded a Mercator professorship by the Deutsche Forschungsgemeinschaft, and holds an honorary doctorate from Universität Bremen.

## **Professor Andrew Y C Nee received the SME Gold Medal**



Andrew Y C Nee has been recognized with the SME Gold Medal for his exceptional and significant published research leading to a better understanding of metal stamping dies design and analysis; plastic injection mold design and analysis; fixture design and planning; and product development of manufacturing. The Gold Medal was awarded to Prof Nee on 9 June 2014 during the International Awards Gala held in Detroit, USA. Professor Nee is widely recognized for his seminal research contributions to the manufacturing profession in the areas of plastic injection molds, progressive stamping dies, machining fixture design, and more recently, augmented reality applications. His work on plastic injection molds has resulted in a commercial software IMOLD, and for the progressive stamping die IPD, Nee received Singapore's National Technology Award in 2002. His recent work in applying augmented reality to manufacturing operations has opened up a new arena, which could help users better learn and visualize manufacturing operations, leading to significant productivity gains. Nee is a recipient of the SME Outstanding Young Manufacturing Engineer Award in 1982, elected SME and CIRP Fellows both in 1990, and was the president of CIRP in 2012. He holds honorary professorship of five universities in China. In February 2014, Nee was appointed editor-in-chief of Springer's "International Journal of Advanced Manufacturing Technology."

## **Professor Hoda ElMaraghy Receives Canada's "Engineering Ambassador Award"**



Professor Hoda ElMaraghy is the first recipient of the "Engineering Ambassador Award" in Canada in recognition of being a pioneering leader in her field and exceptional contributions to Canadian research in Engineering and the communication of its results and significance to the public. The awards ceremony was held in Ottawa, Ontario on 23 May, 2014. Professor Hoda ElMaraghy is shown in the photo during the presentation with Senator Joseph A. Day (MC) and Madame Denise Amyolt (PIR).

*In presenting the award, Dr. ElMaraghy was recognized for "her role as a leading woman in engineering. She set up a scholarship many years ago to encourage women to pursue an education and career in engineering. In 1994, she became the first woman dean of an engineering faculty in Canada and provided a visible and much-needed role model for others, making her a true ambassador for engineering".*

## Professor Fritz Klocke received the Eli Whitney Productivity Award



Professor Fritz Klocke has been recognized with the Eli Whitney Productivity Award for seminal contributions to the development of a broad range of new manufacturing processes as well as the improvement of existing manufacturing methods. Klocke studied manufacturing engineering at the TU Berlin, was a research fellow at the Institute for Machine Tools and Manufacturing Technology until 1981 and then as head engineer until 1984, receiving his engineering doctorate in 1982. Klocke worked in industry from 1984 until 1994 at Ernst Winter & Sohn in Hamburg. In 1995, he joined RWTH Aachen as professor of manufacturing engineering technology, and since then, has been chair of manufacturing technology, co-director of the WZL Laboratory for Machine Tools & Production Engineering at the RWTH Aachen and head of the Fraunhofer Institute for Production Technology. Klocke was awarded the Otto-Kienzle Memorial Coin in 1985 by the Manufacturing Engineering University Group. The title doctor engineering honoris causa (Dr.-Ing. E.h.) was bestowed on Klocke by the University of Hannover in 2006 for his outstanding achievements in science, his efforts in the industrial implementation of a broad range of manufacturing techniques as well as for his commitment in numerous scientific committees. In 2009, the title doctor honoris causa (Dr. h.c.) was awarded to Klocke by the University of Thessaloniki for his achievements in production science, his engagement in international cooperations and his benefits as a teacher and supervising tutor of student engineers. In 2010, Klocke received the Fraunhofer Medal and was bestowed an honorary doctorate by Keio University. He was elected to the 2012 SME College of Fellows

## Professor Robert X. Gao elected to 2014 SME College of Fellows



Robert Gao is the Pratt & Whitney Chair Professor in Mechanical Engineering at the University of Connecticut. Since receiving his PhD (measurement and control) from the Technical University of Berlin, Germany in 1991, he has been working on physics-based sensing methodologies, sensor characterization, RF and acoustic-based wireless data transmission, and multi-resolution signal analysis for improving the observability in manufacturing equipment and processes. An author of two books and over 300 refereed papers in journals, conference proceedings, and book chapters, he has supervised 40 postdoctoral studies, PhD dissertations, and masters' thesis, delivered over 50 invited speeches, and holds five US patents.

Gao's contributions have been recognized by multiple awards in manufacturing, automation, and measurement science. Currently he serves as an associate editor for the *ASME Journal of Manufacturing Science and Engineering* and the IFAC journal *Mechatronics*. He has been a member of the Scientific Committee of the North American Manufacturing Research Institution of SME (NAMRI/SME) since 2008. He is also a Fellow of ASME and IEEE, and a member of the Connecticut Academy of Science and Engineering

## Jean-Pierre Kruth wins 2015 Bower Science Award for 3D printing research

Professor Jean-Pierre Kruth has won the [2015 Bower Award and Prize for Achievement in Science](#), one of the richest and most prestigious science prizes in the United States.

Professor Kruth was recognised “for his pioneering research in additive manufacturing, which led to many technological innovations and several global companies,” according to the award citation. The award is conferred yearly by [The Franklin Institute](#) and comes with a cash prize of \$250,000.



Professor Kruth leads a team of engineers at KU Leuven’s Production Engineering, Machine Design and Automation Section in the Department of Mechanical Engineering. He has been at the forefront of research in additive manufacturing (AM) since it emerged in the 1990s.

AM is a technology that adds material in a layer-by-layer process directed by a digital model. It is also known as 3D printing. In the last decades, AM has evolved from a novel but expensive method for ‘rapid prototyping’ to a full-fledged method for manufacturing a wide range of made-to-measure components and products. Today the technology is used in many fields, including the automotive, aerospace, military, engineering, dental and medical industries.

In its citation, the Franklin Institute praised Kruth’s role in spurring AM research and development: “His work has inspired further research, enabled the creation of many patents, and built the foundation for others’ businesses.” Among the companies to benefit from Professor Kruth’s innovations are the KU Leuven spin-offs [Materialise](#) and [LayerWise](#).

The Franklin Institute, named for the scientist and statesman Benjamin Franklin, is a celebrated science museum in Philadelphia. Its awards programme dates back to 1824 and laureates include Thomas Edison, Niels Bohr, Max Planck, Albert Einstein and Stephen Hawking. The Bower Award and Prize for Achievement in Science was established in 1990 and is presented annually to a distinguished member of the international scientific community for work in a prescribed discipline that changes each year. This year’s discipline was additive manufacturing. The prize will be handed over in Philadelphia in April 2015.

## General Pierre Nicolau Award

The General Pierre Nicolau Award and the F.W. Taylor Medal are the important CIRP awards, presented by the CIRP president, professor Monostori during the opening session of the 64<sup>th</sup> General Assembly in Nantes at Monday 25 August:



The International Academy for Production Engineering has instituted the General Pierre Nicolau Award to honour his renowned authority in the field of production engineering, commemorating his contributions to the founding of CIRP.

I am very much honoured to announce that this year the most prestigious award of CIRP goes to Charles W. Hull (shortly Chuck Hull).

Chuck Hull is the inventor of the solid imaging process known as stereolithography (3D Printing); the related patent was issued on March 1, 1986. He built the first commercial rapid prototyping technology, and first used the

STL file format. He made on more than 60 U.S. patents as well as other patents around the world in the fields of ion optics and rapid prototyping. Chuck Hull is the co-founder, board member, executive vice president and chief technology officer of 3D Systems Inc. He is considered as “The Father” of “Additive Manufacturing” or “3D Printing” as it is called today.

Chuck Hull received many-many distinctions; it would be hard to enumerate all of them. The inventor of 3D printing and founder of now unstoppable industry giant 3D Systems was inducted into the National Inventors' Hall of Fame in Alexandria, USA, March 2014. Chuck Hull was cemented in the history books alongside the likes of electric light inventor Thomas Edison and Alexander Graham Bell.

Chuck Hull’s enormous successful work was the ignition point to a very broad paradigm change in product design and manufacturing. The “Proof of Concept” was done by academia and industry, including significant contributions from our community. We are not able today to estimate or predict its dimensions. Nevertheless all know it, or feel it is close to a revolution in product innovation design and manufacturing and will keep all production engineers and our academy members busy for many years to come. The value of an award is given by the persons who have received it. I proudly hand over the tis year General Pierre Nicolau Award to Chuck Hull.

## F.W. Taylor Medal

As an incentive for scientific work, the International Academy for Production Engineering has instituted the Frederick Winslow Taylor Medal of CIRP - a distinction for young scientists. Candidates for the award must have personally presented their research at a Paper Session during the two years preceding their nomination. Recipients are not to be over 35 years of age in the year of the presentation of their paper. Having looked at the list of recipients from 1958, I can state that we can be proud of the award winners. I am glad to announce that the Taylor Medal this year was awarded to Dr. Vikram Bedekar. He presented a paper on “Nanostructural Evolution of Hard Turning Layers in Response to Insert Geometry, Cutting Parameters and Material Microstructure” at the STC-C during the CIRP General Assembly in Copenhagen, Denmark past August.



In his interdisciplinary study, Dr. Bedekar investigated the nanostructural transformation of white layer by manipulating the incoming microstructure and the cutting parameters. This new knowledge is significant for quantitative predictive modelling and controlling of the surface integrity of the machined components.

Dear Dr. Bedekar, I congratulate to you, and wish you much success in your professional and as well as in your personal life!

## CIRP UK Best Presentation Award 2014

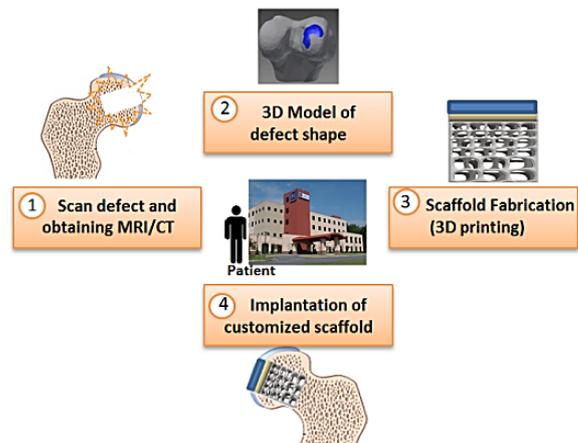


The CIRP-UK Best Presentation Award has been delivered to **Natacha Rodrigues** (Newcastle University) for her paper “Materials Processing for the Manufacture of Hybrid Biopolymer-Bioceramic Medical Devices at the Point of Need”

Osteochondral defects result in severe pain and disability for millions of people worldwide and massive healthcare costs, and are prone to induce osteoarthritis over time. There is a recognized need for improving the current treatment of large osteochondral defects, which affect both articular cartilage and the underlying subchondral bone.

The use of **Additive Manufacturing** has been growing in recent years due to its ability to directly print 3D porous osteochondral scaffolds with a patient specific geometry, which are solvent-free, and have a controlled and interconnected porosity.

The term aim is to develop a system for creating personalised hybrid composites which can be manufactured at the point of need. In order to achieve this future work will focus on developing automated design and manufacture processes to support the fabrication and configuration of hybrid bioactive devices for large defects which are load bearing, functionally gradient and can be biologically enhanced



# ELECTIONS by the General Assembly

## Fellows elected

- Prof. J. Allwood (UK)
- Prof. D. Banabic (Romania)
- Prof. P. Bartolo (Portugal)
- Prof. J. Cao (USA)
- Prof. K. Erkorkmaz (Canada)
- Prof. L. Fratini (Italy)
- Prof. J.M. Linares (France)
- Prof. D. Mourtzis (Greece)
- Prof. W. Sihn (Austria)
- Prof. Y. Takaya (Japan)
- Prof. Y. Umeda (Japan)

## Fellows (Emeritus)

- Prof. T. Arai (Japan)
- Prof. T.K. Lien (Norway)
- Prof. Y. Takeuchi (Japan)
- Prof. S. Tichkiewitch (France)

## New STC Chairmen

- |       |                  |
|-------|------------------|
| STC G | Prof. J. Aurich  |
| STC M | Prof. C. Brecher |

## New Associate Members

- Prof. C. Herrmann (Germany)
- Dr. X. Lu (Canada)
- Dr. J. Munoa (Spain)
- Dr. M. Rabiey (Switzerland)
- Dr. A. Riel (France)
- Prof. H. Utsunomiya (Japan)
- Prof. B. Cheung (Hong Kong)
- Dr. M. Colledani (Italy)
- Prof. W.-G. Drossel (Germany)
- Dr. T. Furumoto (Japan)
- Dr. Y. Karpat (Turkey)
- Prof. M. Schmidt (Germany)
- Prof. J. Yan (Japan)

## New Corporate Members

- Ott-Jakob Spanntechnik (Germany)
- Module Works (Germany)
- S.K.L. (Hong Kong)
- XPRES (Sweden)
- The TIMKEN Company (USA)
- LEGO System (Norway)
- SYMG (China)
- FERRARI (Italy)
- ITRI (Taiwan)
- Digital Manufacturing & Design Innovation (USA)
- PMR (Taiwan)

## Members who passed away since the previous General Assembly

- |                                   |            |   |
|-----------------------------------|------------|---|
| Prof. John R. Crookall (UK)       | 1935-2013, | fellow since 1976. Obituary read by prof. Roy       |
| Prof. B. John Davies (UK)         | 1924-2013, | fellow since 1977. Obituary read by prof. Hinduja   |
| Prof. Naoya Ikawa (Japan)         | 1933-2013, | fellow since 1985. Obituary read by prof. K.Ueda    |
| Dr. Robert L.(Dick) Kegg (USA)    | 1935-2014, | fellow since 1976. Obituary read by prof. Altan     |
| Prof. Steve Malkin (Israel)       | 1941-2013, | fellow since 1980. Obituary read by prof. Hashimoto |
| Prof. Dieter Schmoeckel (Germany) | 1931-2013  | fellow since 1987. Obituary read by prof. Groche    |
| Prof. Klaus Siegert (Germany)     | 1939-2014, | fellow since 1999. Obituary read by prof. Liewald   |
| Prof. Gunther Spur (Germany)      | 1928-2013, | fellow since 1966. Obituary read by prof. Ullmann   |

# Cirp Encyclopedia of Production Engineering: story of a huge success!

During the GA in Nantes Thomas Lehnert from Springer reported on the status of the CIRP encyclopedia of production engineering. It turns out the Cirpedia stands above the crowd with more than **12700 chapter downloads** in just 4 months! Here are a few highlights about the history of this project:

**2005:** Luc Laperriere becomes secretary of STC-D (2005-2007)

**2006:** The natural evolution of CIRP Dictionaries into an Encyclopedia is proposed by Hans Kurt Toenshoff.

**2007:** Luc Laperriere becomes Chairman of STC-D (2007-2011).

**2008:** CIRP Council is consulted for approval of the Cirpedia project “Cirpedia” first coined by Jack Jeswiet in Manchester GA.

**2009:** Luc Laperriere meets Thomas Lehnert and other Springer staff in Heidelberg to design first Cirpedia prototype. Editorial structure for Cirpedia is proposed and approved. Presentation of the first Cirpedia prototype in each of the three tracks in Boston.

**2010:** STC-D becomes Terminology. Contract with Springer signed in Pisa. Full deployment of editorial structure and author’s appointment.

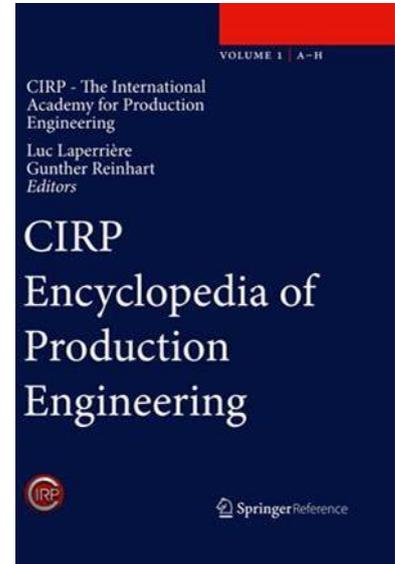
**2011:** Gunther Reinhart becomes Chairmen of Terminology. Luc Laperriere remains responsible for Cirpedia as co-Editor in Chief with Gunther Reinhart

**2012:** Cirpedia goes into production mode.

**2013:** Web version available on SpringerReference.com. Cirpedia opened in dashboard. Luc Laperriere proof reads print version.

**2014:** Printed and static (pdf) versions are launched. Cirpedia v2 starts being worked on.

So far more than 225 authors from 25 countries have contributed. On the editorial side, 16 editors have been involved. Cirpedia v1 contains 256 essays. Cirpedia v2 is also on a great start and is expected to provide more than 50 new essays.



# Our Annals

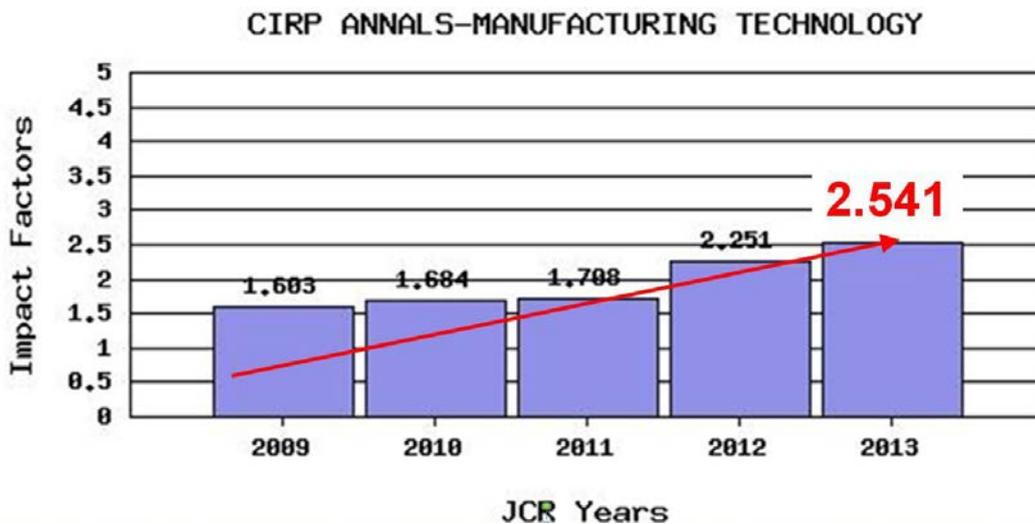
## CIRP Annals ranked at No. 6 worldwide

At the SJR (SCI Journal Ranking) site we can find how our annals perform worldwide. If we select Engineering as Subject Area and Industrial and Manufacturing Engineering as Subject category, we find CIRP Annals as No. 6 out of 158 journals world-wide.

[http://www.scimagojr.com/journalrank.php?area=2200&category=2209&country=all&year=2012&order=sjr&min=0&min\\_type=cd](http://www.scimagojr.com/journalrank.php?area=2200&category=2209&country=all&year=2012&order=sjr&min=0&min_type=cd)

## Notes from the Editorial Committee

It is my pleasure to report on recent developments with regard to the visibility of CIRP publications. Let me first address our flagship, the annals. Another year in a row the continuous actions to improve the quality of our Annals have paid off by a newly increased impact factor. For the 2013 edition of our Annals it has gone up to the new record value of 2.541. The 5 years impact factor has also reached its highest value so far with 2.828.

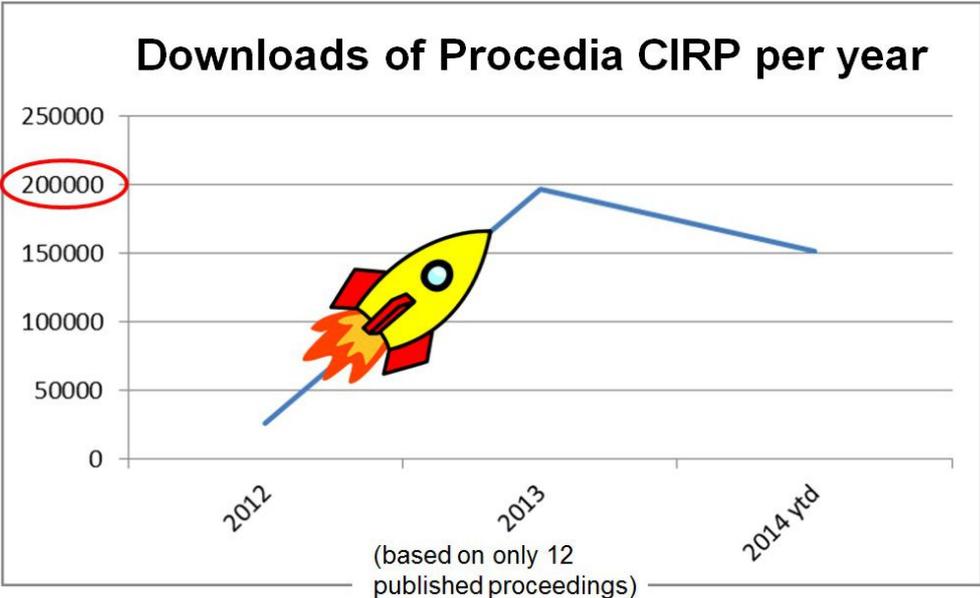


The self-citations are stable at a level of 25%, which is a good sign and indicates that the impact factor of this year is mainly the result of citations from competitor journals in the field. The number of downloads per year is likely to exceed half a million soon, thus the establishment of the CIRP annals as top ranking journal is regarded as absolutely stable.

Another impressive result was achieved with the introduction of **Procedia CIRP** to CIRP owned conferences. The decision to establish a common procedure with Elsevier to organize and publish papers of CIRP owned conferences (and CIRP sponsored conferences if the organizers decide to choose this instrument) was taken in order to guarantee a worldwide access to these conference papers with a CIRP-approved review procedure. To date we have published 18 CIRP (owned and sponsored) conference proceedings, of which 5 were published in 2014 so far. There are already the next 9 conferences scheduled and announced.

For further information please visit: <http://www.journals.elsevier.com/procedia-cirp/>

The impact of this decision can be seen by the number of downloads per year. As shown in the chart within one year we have gone up to 200.000 downloads with only 12 registered conferences so far. This can only be seen as a “rocket-like departure”; clearly leaving an impressive impact in the production engineering world. We continuously work on the improvement of the Procedia conference tool based on the well-established EES software from Elsevier. Soon there will be a kind of “cook-book” for all CIRP owned conferences explaining the most important steps of organization with a related representative time schedule. In addition minor changes that have already been identified together with Elsevier will help to further improve this system.



With these positive results we look forward towards new challenges in the outside appearance and recognition of the work of our academy.

Bernhard Karpuschewski  
EC-Chairman

## From the Research Affiliates

### Time flies

“Time goes quickly” and “Change costs time” are two well-known expressions that do not go well together. My two-year term as Chairman of the RA network has almost passed and I find that the first expression definitely holds. The two years as chair really flew by! I am proud to say that the second expression applies less. I think we managed to set the wheels in motion and transform our community from the start-up stage to a more consolidated stage. Many new activities have sprouted from within our community. I would like to touch upon a few.

## **Interactive workshop sessions**

Next to the well-accepted 1-way presentation format, we decided to shake things up a bit and organize a more interactive workshop type of element during our General Assembly meetings. In Nantes, all RAs were grouped according to their primary STC and we asked each group to make a poster about the current research activities within the STC. Quickly the groups left the room and I started to wonder if this was a smart activity to plan. Fortunately after about 30 min. the groups returned and presented their findings to each other. As a side effect: RAs that share a research field got to know each other better and the whole community was informed about the important research activities within the STCs.

## **1-minute pitches**

This General Assembly we also initiated a new quick presentation approach. All RAs that will be presenting a paper or technical presentation during the GA are given the option to pitch their work in 1-minute. This way we keep our community updated on recent RA research activities, and RAs have the chance to promote their work and attract a bigger audience to their full presentation. Additionally, it is also a fun and interactive element at our 1<sup>st</sup> meeting at the start of the General Assembly.

## **RA agenda**

Looking ahead, for 2015 already two interesting events are planned:

- **RA annual workshop, End of June, 2015 at AMRC in Sheffield, England**

The RA annual workshop remains an excellent forum for RAs –especially seeing the high rejuvenation rate– to interact with each other, share research ideas and activities, and hopefully inspire each other. To promote interaction and personal gain, we organize a mini-workshop prepared by one of the RAs.

- **4<sup>rd</sup> CIRP Web Conference (CIRPe2015) on Sept. 29 – Oct. 1, 2015**

After the successful 3<sup>rd</sup> edition, the 4<sup>th</sup> edition of the CIRP web conference is already planned for Sept. 29 – Oct. 1, 2015. This time RAs John A. Erkoyuncu (Cranfield University) and Rocco Lupoi (Trinity College Dublin) are taking the lead in organizing CIRPe2015. The abstract deadline will be mid-February. More information will become available shortly.

Looking forward to seeing you at the Paris winter meeting or at one of our other activities.

Wessel Wits (CIRP RA Chairman)



*Research Affiliates group photo at the CIRP RA meeting in Nantes, August 2014.*

# From the STC's

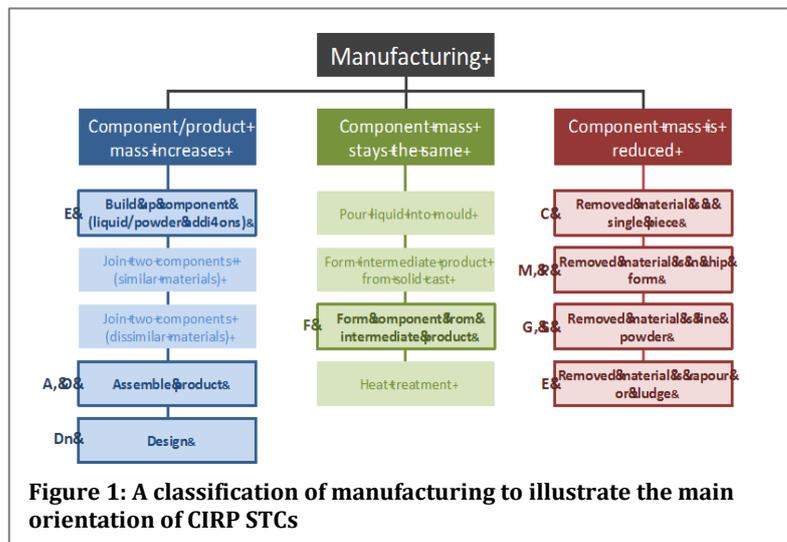
## A (personal) introduction to STC-F

*Summary of a talk to the Corporate Members Advisory Group in Nantes*

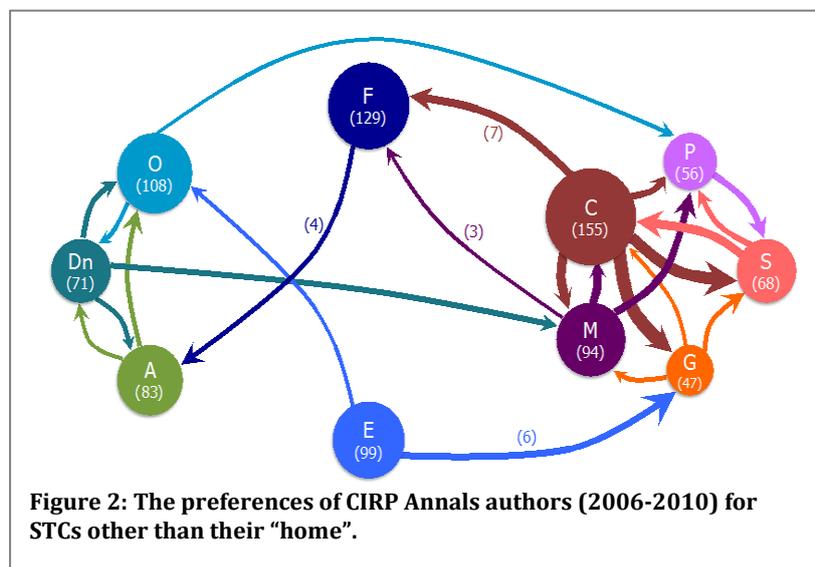
By the nature of academic life, I won't be able to describe our STC to the satisfaction of all of its members – we would all do this differently – so this is a personal view. But I'm delighted to be asked to present it: manufacturing is becoming more integrated, and it's an obvious priority that we should share more insights among the different discipline areas covered within CIRP.

There can only be three actions in manufacturing: increasing the mass; keeping it the same; removing it. The former category includes building up a component, joining, assembly, and the choices of design. The latter can be organised by what's removed – a single piece, chips, fine powder or vapour/sludge. Forming is in the middle category, which also includes casting and heat treatment.

This categorisation is used in figure 1 to illustrate the primary focus of the ten STCs in CIRP. Two surprises are that CIRP has little activity in welding (joining similar materials) and casting, and of course CIRP has to date had a strong orientation towards metals. STC-F primarily focuses on forming metal components from intermediate stock, including the use of heat, but with less emphasis on separate heat treatment. Readers will no doubt be struck by the strong weighting of CIRP towards material removal – which, within STC-F, we view as a waste: a temporary costly measure, needed only until we can form perfect parts!



Having found that at CIRP meetings so many rooms are filled up by people in black suits talking about fracture and vibration, I conducted an analysis of CIRP habits, which is summarised in figure 2. For every author of two or more papers in the CIRP Annals Volume 1, between 2006 and 2010, I counted how many papers they submitted to each STC, and called the most frequent one their "home". The figure illustrates where they also published "away". It demonstrates a close interchange between the (waste generating...) material removal enthusiasts in C, G, M, P and S, and a natural group of A, O, D.



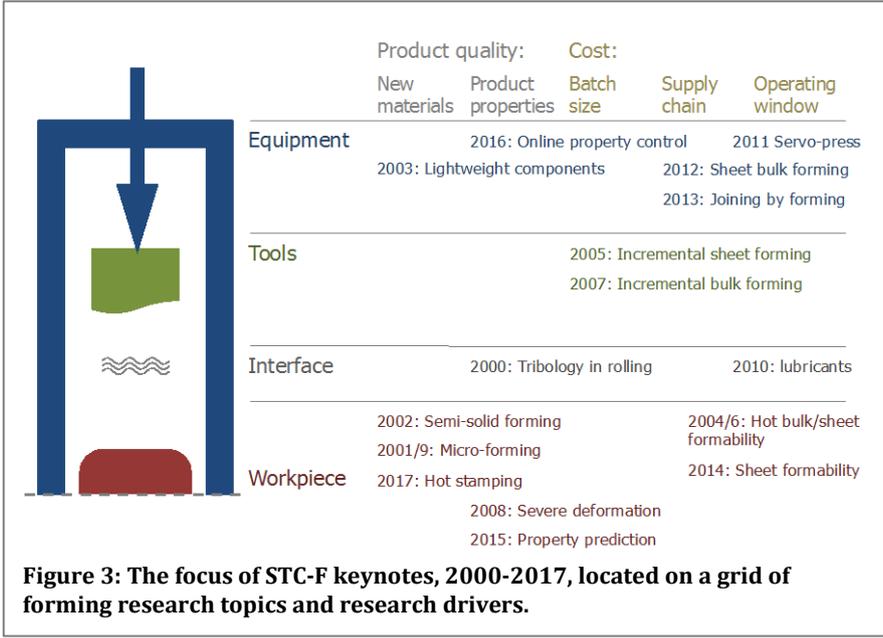
It demonstrates a close interchange between the (waste generating...) material removal enthusiasts in C, G, M, P and S, and a natural group of A, O, D. To me, and perhaps also to friends in STC-E, this figure suggests that it might be possible for CIRP to move towards a more balanced

coverage of production, particularly if we also aim at a more balanced coverage of materials. (We'd also like a bigger room for longer, please.)

All metal forming processes comprise (i) equipment that can apply at least one large force, (ii) tools that define geometry, (iii) an interface between these tools and a workpiece, and (iv) the workpiece itself. Typical research areas include the capability and dynamics of the equipment, the precision and longevity of tooling, friction, heat-transfer and surface effects at the interface, and property prediction and the forming limits of the workpiece. Research in metal forming is generally motivated by two key concerns: product quality and cost. Research aims to improve product properties in exiting processing, and to develop appropriate forming processes for new materials. Opportunities to reduce costs arise from reducing the minimum economic volume of batch production (tooling costs are often high), from supply chain compression (integrating other processes into forming), and from expanding 'operating windows'. However, although forming research is initiated based on a particular process feature and with a particular driver in mind, a fantastic characteristic of our topics is that they expand outwards. Our area is thus strongly integrative – requiring knowledge in materials science, mechanics, tribology, heat transfer, dynamics, design and control among others. It's also very applied. Most of our projects have strong industrial relevance, and few of our presenters escape Professor Altan's thunderous *leitmotiv*: "Why would industry want this?"

Figure 3 illustrates this description of forming research, on which I have attempted to locate the primary focus of the 17 STC-F keynote papers since 2000. This too will inevitably be controversial among my colleagues, as each paper spans horizontally and vertically across the categories, but it's that combination of intellectual challenge, knowledge and inter-disciplinarity which makes our meetings so very interesting. If you feel you've now spent enough time thinking about fracture and vibration and are ready to move on, we'd warmly welcome you to

join us. And if you happen to be thinking about the environmental impacts of manufacturing, bear in mind that by far the dominant part of global carbon emissions from industry arise from the production of materials, and not from downstream manufacturing. The key opportunity for manufacturing to counter global warming is to reduce demand for new material production – and that means giving ever greater priority to



processes that keep the component mass the same; we have to curb our enthusiasm for turning high quality material into chips, dust and sludge. I was a lead author of the Industry chapter of the 5<sup>th</sup> Assessment Report of the Intergovernmental Panel on Climate Change published this year, and am pleased that this message was given priority there ([www.ipcc.ch/report/ar5/wg3](http://www.ipcc.ch/report/ar5/wg3)). As it happens, you can also download for free a nice book on this theme from the website [www.withbotheyesopen.com](http://www.withbotheyesopen.com) – or please come and join us at the next STC-F session.

Julian Allwood,  
*Professor of Engineering and the Environment at the University of Cambridge,*  
*Chairman of STC-F (2013-2016).*

# Our Conferences

For the **most recent overview** of our coming conferences go to: <http://www.cirp.net/meetings-conferences/view-cat/year.listevents/2014/10/31/-html>

## Future Keynotes Papers

Our keynote papers are the result of an intensive collaboration between specialists working together during several years within an STC. They are important state of the art papers on important (new) technological areas. CIRP members who are willing to contribute are invited to contact the coordinator.

### 2015 Keynote Papers in preparation

**STC A: Automated Processes for Joining of Disassembly of Dissimilar Materials** - K. Martinsen (3) *et al.* - Contact: [Kristian.Martinsen@sintef.no](mailto:Kristian.Martinsen@sintef.no)

**STC C: High Performance Cutting of Advanced Aerospace Materials** – R. M'Saoubi (1) *et al.* - Contact: [rachid.msaoubi@secotools.com](mailto:rachid.msaoubi@secotools.com)

**STC Dn: Automating Design with Intelligent Human-Machine Integration** - Yuehong Yin (2), Andrew Y.C. Nee (1), S.K. Ong (1), Jian Y. Zhu (1), Pei H. Gu (1), Lian J. Chen (3) - Contact: [yhyin@sjtu.edu.cn](mailto:yhyin@sjtu.edu.cn)

**STC E: Additive micro manufacturing using short laser pulses** - A. Huis in't Veld, M. Schmidt, G. Levy (1) - Contact: [A.J.HuisintVeld@ctw.utwente.nl](mailto:A.J.HuisintVeld@ctw.utwente.nl)

**STC F: Metal Forming beyond Shaping: Predicting and Setting Product Properties** – A.E. Tekkaya (1) *et al.* - Contact: [erman.tekkaya@udo.edu](mailto:erman.tekkaya@udo.edu)

**STC G: Abrasive Machining of Advanced Aerospace Alloys and Composites** – F. Klocke (1), D.K. Aspinwall (1), S.L. Soo (2), B. Karpuschewski (1), J. Webster (1), D. Novovic, A. Elfizy, D. McIntosh (3) - Contact: [f.klocke@wzl.rwth-aachen.de](mailto:f.klocke@wzl.rwth-aachen.de)

**STC M: Materials in Machine Structures** – H.C. Möhring (2), J. Fleischer (1), C. Brecher (1), E. Abele (1) - Contact: [hc.moehring@ovgu.de](mailto:hc.moehring@ovgu.de)

**STC O: Cloud-enabled Prognosis for Manufacturing** - R. Gao (2), L. Wang (2), R. Teti (1), D. Dornfeld (1), S. Kumara (1), M. Mori (1), M. Helu - Contact: [rgao@engr.uconn.edu](mailto:rgao@engr.uconn.edu)

**STC P: Measurement Technologies for Precision Positioning** – W. Gao (1), S.W. Kim (1), H. Bosse (3), H. Haitjema (2), Y.L. Chen, W. Knapp (1), A. Weckenmann (1), W.T. Estler (1), H. Kunzmann (1) - Contact: [gaowei@cc.mech.tohoku.ac.jp](mailto:gaowei@cc.mech.tohoku.ac.jp)

**STC S: Calibration and Verification of areal texture measuring instruments** - R. Leach, C. Evans (1), H. Haitjema (2), X. Jiang (1) - Contact: [richard.leach@nottingham.ac.uk](mailto:richard.leach@nottingham.ac.uk)

**Cross-STCs: Metalworking Fluids – Mechanisms and Performance** – [E. Brinksmeier \(1\)](mailto:E.Brinksmeier@iwt.uni-bremen.de), [D. Meyer](mailto:D.Meyer@iwt.uni-bremen.de), [A. Huesmann-Cordes](mailto:A.Huesmann-Cordes@iwt.uni-bremen.de), [C. Herrmann \(2\)](mailto:C.Herrmann@iwt.uni-bremen.de) - Contact: [brinksmeier@iwt.uni-bremen.de](mailto:brinksmeier@iwt.uni-bremen.de)

### 2016 Keynote Papers in preparation

**STC A: The Role of Manufacturing on the Social Dimensions of Sustainability** - J. Sutherland (1) *et al.* - Contact: [jwsuther@purdue.edu](mailto:jwsuther@purdue.edu)

**STC C: Cryogenically-Assisted Processing of Materials - I.S. Jawahir (1) et al. - Contact: [jawahir@engr.uky.edu](mailto:jawahir@engr.uky.edu)**

**STC Dn: Design for Additive Manufacturing – G. Moroni (2), M.K. Thompson – Contact: [giovanni.moroni@polimi.it](mailto:giovanni.moroni@polimi.it)**

**STC E: Machining of Engineering Ceramics by Electro-Physical Processes – E. Ferraris, B. Lauwers (1), J.P. Kruth (1) - Contact: [Eleonora.ferraris@kuleuven.be](mailto:Eleonora.ferraris@kuleuven.be)**

**STC F: Closed loop Control of Product Properties in Metal Forming - J. Allwood (1) et al. - Contact: [jma42@cam.ac.uk](mailto:jma42@cam.ac.uk)**

**STC G: Abrasive Fine-Finishing Technology – F. Hashimoto (1), H. Yamaguchi (2), K. Wegener (2), H.W. Hoffmeister, P. Krajnik, R. Chandhari, D. Dröder, F. Küster (3) – Contact: [fukuo.hashimoto@timken.com](mailto:fukuo.hashimoto@timken.com)**

**STC M: Chatter Suppression Techniques – J. Munoa (2), E. Budak (1) - Contact: [jmunoa@ideko.es](mailto:jmunoa@ideko.es)**

**STC O: Cyber-Physical Systems in Manufacturing – L. Monostori (1) B. Kádár (2), T. Bauernhansl, S. Kondoh (2), S. Kumara (1), G. Reinhart (1), O. Sauer (3), W. Sihn (1), K. Ueda (1) – Contact: [monostor@sztaki.hu](mailto:monostor@sztaki.hu)**

**STC P: Large-Scale Metrology - A new update – R. Schmitt (2), F. Härtig (3), W. Knapp (1), G. Goch (1), E. Morse (3), Hughes, T. Estler (1), M. Mitsuishi (1) – Contact: [r.schmitt@wzl.rwth-aachen.de](mailto:r.schmitt@wzl.rwth-aachen.de)**

**STC S: Mechanical Surface Treatments with guided Tools – V. Schulze (2), T. Altan (1), D. Axinte (1), F. Bleicher (3), P. Groche (1), Y. Pyun – Contact: [volker.schulze@kit.edu](mailto:volker.schulze@kit.edu)**

**Cross-STCs: Process Chains for Micro-Featured High Precision Components – E. Uhlmann (1), B. Mullany (2), D. Biermann (2) - Contact: [eckart.uhlmann@ipk.fhg.de](mailto:eckart.uhlmann@ipk.fhg.de)**

## 2017 Keynote Papers in preparation

**STC A: Innovative Control of Assembly Systems and Lines - Jörg Krüger (2), Lihui Wang (2), Alexander Verl (2), Hoda ElMaraghy (1), Waguih ElMaraghy (1), Jörg Franke (2), Tullio Tolio (1), Dariusz Ceglarek (1), Günther Seliger (1), Christian Brecher (1), Sotiris Makris (2) - Contact: [joerg.krueger@tu-berlin.de](mailto:joerg.krueger@tu-berlin.de)**

**STC C: Material and Friction data for Modeling of Machining Operations (draft title) - S. Melkote (2), W. Grzesik (2) et al - Contact: [shreyes.melkote@me.gatech.edu](mailto:shreyes.melkote@me.gatech.edu)**

**STC Dn: Design for Reduction of Energy use Consumption - J. Duflou (1), L. Shu (1), G. Seliger (1), J. Srivastava - Contact: [Joost.Duflou@mech.kuleuven.be](mailto:Joost.Duflou@mech.kuleuven.be)**

**STC F: Hot stamping of ultra-high strength steel parts - K.I. Mori (1) et al - Contact: [mori@plast.me.tut.ac.jp](mailto:mori@plast.me.tut.ac.jp)**

**STC M: Fluids and its impact on Machine Tools - B. Kaftanoglu (1), K. Wegener (2) - Contact: [bilgink@atilim.edu.tr](mailto:bilgink@atilim.edu.tr)**

**STC P: Contributions of Precision Engineering to the "New SI" - H. Bosse (3), A. Balsamo (1), T. Estler (1), I. Robinson, M. de Podesta, H. Kunzmann (1), P. Shore (2), A. Donmez (2), J. Pratt - Contact: [Harald.Bosse@ptb.de](mailto:Harald.Bosse@ptb.de)**

**Cross-STCs: Additive Manufacturing in Industry and Science - challenges and chances - M. Schmidt (2), A. Huis in't Veld, M. Merklein (2) - Contact: [Michael.Schmidt@fau.de](mailto:Michael.Schmidt@fau.de)**

# From the CIRP Office



*Chantal Timar-Schubert*

Annals papers/keynote papers submission process, CIRP meetings, the Website, candidatures for Membership, Internal Regulations and any internal information.



*Agnès Chelet*

Financial aspects: accountancy, membership fees, page charges, conferences sponsorships, Winter meetings registration + Agendas & Minutes of the scientific meetings.

Here is the news from the CIRP Office:

- We remind you that the CIRP Winter Meetings will be held in February from 2015 onwards. All information on the next CIRP Winter Meetings is already available online on the Website.
- Following a large majority of favourable votes from the CIRP Community, the CIRP Directory will no longer be printed in hard copy but only available online on the Website. You can already find it in your Dashboard as well as through the “Members” button on the Home Page.
- Please read online the new modifications in the Internal Regulations (through the button “About CIRP”) voted at the last General Assembly in Nantes, about the renewal of Associate membership (Article 6) and the General Nicolau Award (Article 22).
- We remind Fellows, Honorary Fellows and Fellows (Emeritus) that they can propose candidates for the 2015 General Nicolau Award up to December 1<sup>st</sup>. Rules are online.

With kind regards,

*Chantal*

## Future CIRP Meetings

### January meetings

18-20 February 2015, Paris

17-19 February 2016, Paris

15-17 February 2017, Paris

### General Assemblies

23-29 August 2015, Cape Town, South Africa

21-27 August 2016, Guimaraes, Portugal

# The International Additive Manufacturing Award

The International Additive Manufacturing Award (IAMA) will be given annually to recognize definitive and meritorious innovation in additive manufacturing. Innovators (individuals and teams) from all over the world are invited to apply. The inaugural award ceremony will take place March 2015 in the United States at The MFG Meeting in Orlando, Florida. The deadline to submit applications is December 31, 2014.

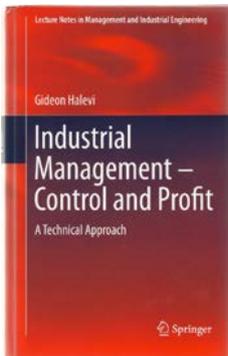
## Prize

The IAMA winner will receive a \$20,000 cash prize plus an \$80,000 media package to promote development of the winning innovation.

Application forms for this award can be found on: [www.additive-award.com](http://www.additive-award.com)

## New Books

### Industrial Management – Control and Profit A Technical Approach Springer By Gideon Halevi



This volume presents controlling tools for management in order to be in a position to communicate with control engineers concerning technological decisions.

The main objective of manufacturing management is to make profit. However, in traditional manufacturing systems none of the separate stages in the process support this objective. Management is not expert in any of these stages, and therefore is dependent on specific experts at each stage and must follow their decisions. Each stage has its own first priority which is not profit and cost. This means that management does not have real control over these functional stages, nor over the process as a whole.

This book presents controlling tools for management in order to allow them to communicate better with the experts of the particular manufacturing stages to reach better results and higher profits. It is shown that most enterprises can improve their efficiency rate by between 25 and 60% by using the tools developed here.