

TOPICALITIES

Edited by Markéta Držková

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News & more

A brief overview of patents granted to printing press manufacturers during the last five years

When looking back at the article dealing with the patents granted to leading printing press manufacturers in 2017, which was presented in this section in JPMTR Vol. 7, No. 1 (2018), not much changed among the companies that are the most active and successful when considering filed patent applications and granted patents. However, the numbers of published patents for Manroland Sheetfed and Manroland Web Systems, since 2018 Manroland Goss Web Systems, are significantly lower compared to Koenig & Bauer and Heidelberg Druckmaschinen. When considering each Manroland company individually, Komori outperformed both in the period in question. In the case of all these companies, the most common classification among their patents is B41F (Printing machines or presses). Selected inventions of the three leading companies are presented in the following sections, and those of the remaining two are in the side column, where some of the patents related to printing machines or presses and granted to other assignees are also mentioned.

Koenig & Bauer

Since 2018, the overall number of patents granted to Koenig & Bauer worldwide is about a hundred each year, usually above one hundred (documents deduplicated by family). The majority are German and European patents comprising 75 % and 15 %, respectively, followed by the U.S. and Chinese, with a few granted in Japan, Spain and the United Kingdom. Many inventions deal with various solutions improving the construction of the offset or hybrid printing presses, for instance, in terms of different features related to substrate transport, such as DE 10 2013 208 754 B4 for drawing a substrate web into a printing unit, EP 2 714 408 B2 for controlling web tension, EP 2 829 401 B1 for compensating a fan-out induced transverse substrate stretching, and EP 3 448 682 B1 for shingling the sheets to ensure optimum working speed in a hybrid printing machine, particularly suitable for the production of packaging materials. Another example is the possibility of improving the processing quality of cutting or punching in a sheet-fed machine by controlling the gap between the two driven processing cylinders using a distance sensor presented in DE 10 2018 219 715 B3. Some inventions concern flexographic printing of corrugated cardboard, such as EP 3 894 225 B1, which describes using sensors and inspection devices with corresponding image elements in combination with the possibility to change the print length by changing the speed of the forme cylinder relative to that of the respective impression cylinder. Among the patents related to security printing, the U.S. patent 11,220,101 B2 describes the drying unit following an intaglio printing unit and suitable for high printing speeds and the U.S. patent 11,440,312 B2 deals with gravure printing units having special inking units that include one cylinder with recessed elements and another cylinder with raised elements, both corresponding to recessed elements of the printed motif at the printing forme, and preferably a cylinder common for multiple inking devices and transferring the collected ink to the forme cylinder. Another solution is presented in EP 3 781 403 B1, which describes devices, a machine and a method for aligning magnetic or magnetisable particles on a web or sheet substrate, which make use of three magnetic cylinders.

More on the recent patents on printing presses and methods

Manroland Goss Web Systems

The total number of patents granted over the last five years to this joint company or one of the two separately is less than a hundred. This includes the European, German, U.S. and Chinese patents comprising 45 % to 12 %, with a few Spanish and French. The inventions deal, for example, with a device for forming book blocks (EP 2 876 070 B2) or a web-fed rotary printing system for multi-width webs with a single-width folder (DE 10 2009 029 572 B4). The most recent documents, filed in 2021, are the U.S. patent 11,358,192 B2 describing the folding roller with a compressible coating, which allows the processing of different products without changing or adjusting the nip, and the U.S. patent 11,535,024 B2, which presents the 3D-printable wear indicator for components that are in contact with the printed substrate to allow recognising the degree of wear for a timely procurement of replacement part.

Manroland Sheetfed

The yearly number of patents granted in the given period to Manroland Sheetfed is about a dozen on average. The majority are German patents that are complemented by the European and Chinese; the ratio is approx. 6:3:1. Among the recent ones, EP 3 402 678 B1 presents a compact device unlocking a coupling of a double gearwheel in perfecting printing presses, EP 3 463 888 B1 deals with a feeding unit, which provides improved sheet guidance with a longer alignment time to significantly reduce or avoid several problematic aspects of previous constructions, and EP 3 497 045 B1 describes a solution improving the lateral sheet alignment while at the same time simplifying its setting and automatic control during printing.

Patents of other companies

When looking for more companies having recently granted several patents with the B41F classification (Printing machines or presses), one significantly represented group comprises the manufacturers of digital presses, such as Xerox, Ricoh, Fujifilm and Canon. That might be a subject of an overview in one of the future JPMTR issues. When considering innovations involving conventional printing techniques, Boe Technology Group can be mentioned. The patents assigned to this supplier of semiconductor display and sensor technologies, some jointly with partner companies, include EP 3 263 351 B1 presenting the screen-printing method and apparatus with a well-controlled squeegee pressure as needed in the production of OLED screens, the U.S. patent 10,052,863 B2 describing printing screen suitable for printing uniform display sealant layer and the U.S. patent 10,166,758 B2 dealing with the anilox roller for producing an alignment layer in a liquid crystal display panel, which has a liquid carrying capacity adjustable through modifying the surface area. Further, the U.S. patent 10,303,004 B2 presents the method for manufacturing a quantum dot display device, and the U.S. patent 11,351,803 B2 covers the production of a touch panel. Several patents dealing with screen printing were also granted to Panasonic, such as the U.S. patent 10,850,498 B2 aimed at electronic component manufacturing. As another example, the U.S. patent 10,549,564 B2 of Nike combines screen printing, inkjet printing and application of the sublimation dye to provide quality print on garments made of polyester blends. In a different application area, EP 2 432 699 B1 of Procter and Gamble describes flexographic printing of various materials and graphic images onto a water-soluble film and feeding it into the unit producing detergent pouches. As the last example from yet another application area, EP 2 958 749 B1 of Crown Packaging Technology and the U.S. patent 11,130,331 B2 of Ball Corporation present innovations concerning printing on cans.

Heidelberg

The yearly number of patents granted across the world from 2018 to 2022 to Heidelberger Druckmaschinen is similar as for Koenig & Bauer, being the highest in 2018 and then decreasing and stabilising close to one hundred. The distribution is more even, with the German, Chinese, European, U.S. and Japanese patents comprising 36 % to 13 % and complemented by a few Spanish and Danish patents. Besides the construction features, the inventions deal with various tasks in other areas. To name a few examples among the U.S. patents, 11,288,793 B2 introduces a dynamic adaptation of the print inspection process to match the available time frame, and 11,294,610 B2 presents a method for flexible processing of a job queue when reaching the sufficient number of jobs while considering printed pages or products or print jobs, as well as the available machines for offset, electrophotographic or inkjet printing; unlike these software solutions, 11,453,223 B2 deals with controlling opaque white inline in printing machines and 11,500,595 B2 describes the setup for generating security elements preventing the risk of later conversion into another colour profile and thus impairing the validity of the security element. The most recent patent, DE 10 2022 102 523 B3, granted at the end of 2022, presents an improved method of compensating the defective nozzles to further increase the inkjet print quality. It makes use of the test pattern with a large number of test fields with a suitable range of tonal values, where unprinted lines are intentionally produced and compensated with different strengths of the neighbouring nozzle at several locations within the sheet. The optimal compensation is evaluated from the image, which is captured preferably with an industrial line-scan camera under bright field illumination, and applied in production printing.

Komori

The overall number of patents granted to this company in the given period is approximately five times lower than for the two major manufacturers, and the yearly numbers show a decreasing trend. The difference is even more evident when comparing the number of applications filed during the last five years; in this case, it is roughly 15 times lower for Komori than for Koenig & Bauer or Heidelberger Druckmaschinen. Considering the territorial coverage, it naturally differs from the Germany-based companies; the largest share belongs to Japanese patents (45 %), followed by the European, U.S. and Chinese, with some granted in Taiwan, Germany and Canada. Despite the relatively low number of patents, the inventions concern a wide range of production aspects for different processes, printing techniques and products. For example, the U.S. patent 10,071,392 B2 presents the apparatus for manufacturing flexible electronic devices, such as thin film transistors, using one impression cylinder rotating in forward and reverse directions, various coating and printing units for depositing conductive, insulating or other functional layers, as well as a drying or curing unit. Another application area is covered by EP 3 517 299 B1, which deals with measuring the thickness of varnish film on a printed product. In particular, the solution is intended for security printing. It employs non-contact detecting film thickness of varnish coated directly on the metallic foil with a smooth surface – a hologram or security thread – incorporated onto the base material. Also, security printing is in focus in the case of EP 3 517 300 B1. It describes the solution for print quality inspection in an area including the so-called motion threads in which positions of patterns change depending on the angle of view. Therefore, only the colour of the same hue as the colour of the motion thread is considered to avoid false positives, while the full-colour data are evaluated in the other areas.

Bookshelf

4D Printing

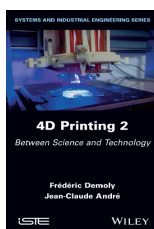
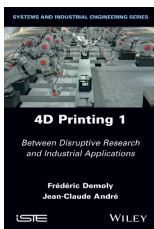
Volume 1: Between Disruptive Research and Industrial Applications

Volume 2: Between Science and Technology

The authors review and explain the state of the art of 4D printing in the text supported by rich literature references and numerous quotations. They share their expert opinion on future research and development directions in this field and put them into the perspective of the interaction between – and integration of – science and society. Due to a large number of publications, which deal with 3D printing objects responding to external stimuli, and their exponential growth seen in past years, the content is divided into two volumes.

The four chapters of the first volume deal with the questions if 4D printing is disruptive or incremental or a bit of both, if there is external creativity to support 4D printing, who would prevail today, from Lamarck or Darwin, to help the controlled evolution of 4D printing, and whether the transition from 3D to 4D printing is heading toward possibly programmable self-organisation. The text discusses, for example, the potential development of 4D innovations, financial and organisational aspects, a general public survey on the perception of 4D printing and vision of the future, complexity induced by the stimulation, spontaneous self-organisation, stimulated self-organising systems, and a possibility to envisage a “learning” 4D system.

The main content of the second volume is also organised into four chapters. One examines 4D printing with respect to main stimulation modes, which cause a spatial or functional change. It describes actuators, their types, properties and the requirements specific to 4D printing, characteristics of programmable matter, materials for 4D printing, activation by physical stimuli, swimming robots as a transition to 4D printing, current developments and possible applications, as well as the related difficulties. The following short chapter deals with energy stimulation, an area with many questions open. The next chapter is focused on industrial 4D printing, namely the routes from research to innovation, from matter to 4D form, and from 4D form to function. This includes the role of 4D printing in future projects and gaps between research and profitable applications, with the challenges of getting beyond the proof-of-concept stage. The last chapter is dedicated to designing for 4D printing. It discusses the design approaches, a strategic roadmap for research, the evolution of technological solutions and associated challenges, a methodological framework for the design of energy-sensitive structures, capturing and reusing of 4D printing knowledge, functional modelling and solution principles, selection of smart material and stimulus and planning of processing, the definition of design spaces and CAD representations, voxel-based modelling, behaviour simulation and distribution of active materials, digital chain for 4D design and prototyping, claims and practical constraints.



Authors: Frederic Demoly, Jean-Claude Andre

Publisher: Wiley-ISTE

1st ed., September & October 2022

ISBN: 978-1-786-30731-6 & 978-1-786-30810-8

368 & 320 pages

Hardcover

Available also as an eBook



Advances in Fashion and Design Research

Editors: Ana C. Broega, Joana Cunha, Hélder Carvalho, Bernardo Providência

Publisher: Springer
1st ed., October 2022
ISBN: 978-3031167720
816 pages, 260 images
Softcover
Also as an eBook

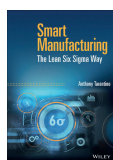


This volume presents a selection of 67 peer-reviewed papers presented at the 5th International Fashion and Design Congress, CIMODE 2022, which took place in Guimarães, Portugal. It covers seven major themes in fashion and design, which comprise communication, identities and cultures, product design, marketing and consumption, teaching and education, sustainability, and emotional design and fashion. The topics include, among others, 3D printing applied on painting canvas, transforming polyamide mesh waste into 3D printer filament, and digital transformation in purchasing print and pattern designs in the textile and apparel industry.

Smart Manufacturing The Lean Six Sigma Way

Author: Anthony Tarantino

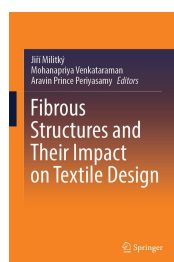
Publisher: Wiley
1st ed., May 2022
ISBN: 978-1119846611
464 pages
Hardcover
Also as an eBook



The methods and approaches explained in this new book have gained even higher importance due to COVID-19 and other challenges recently faced by manufacturers. The first three chapters provide the background on the industrial revolutions up to Industry 4.0 and the key components and advantages of smart manufacturing and detail lean, six sigma and continuous improvement tools. In the remaining chapters written by the main author and other contributors, the book deals with the use of smart technologies

Fibrous Structures and Their Impact on Textile Design

The objective of this book was to fill the gap in the literature on textiles, which usually focuses on either technical or aesthetic aspects while the mutual understanding of the relevant context is beneficial to both technical specialists and fashion designers. The book begins with a chapter that outlines textile development concerning clothing and technical applications, including the trends in functional and smart textiles. It discusses the future challenges related to the textile industry's changes towards greater sustainability and their implications for designers. The following three chapters discuss recent trends in textile structures and the importance of end-use considerations when developing innovations in the field of textiles, the desired properties of fibres, yarns and fabrics with their impact on design, as well as the specific features of colour and design for textiles based on the interaction of light with different types of fabric. Light is in focus also in the next chapter, which presents the development of side-emitting plastic optical fibres and the autonomous line illumination system along with the practical use of lighting and colour effects for contemporary design, safety or other special purposes. Then, one chapter deals with haptic perception and methods for evaluating and indirectly predicting the fabric handle. The next one is dedicated to business aspects in the textile industry; it reviews the business models and marketing strategies that reflect the changes in consumer behaviour and technological progress. The last chapter presents examples demonstrating new design possibilities opened by smart materials and advanced processing technologies.



Editors: Jiří Militký, Mohanapriya Venkataraman, Aravin Prince Periyasamy

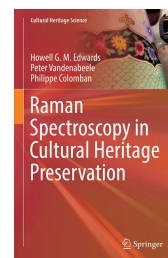
Publisher: Springer
1st ed., September 2022
ISBN: 978-981-19-4826-8
266 pages, 211 images
Hardcover
Available also as an eBook

Raman Spectroscopy in Cultural Heritage Preservation

This book describes the theory and instrumentation of Raman spectroscopy, a method that enables nondestructive and noninvasive characterisation of both organic and inorganic components of – often unique – specimens at the laboratory or on-site. Its combinations with other analytical techniques are also mentioned. Among other applications, the text covers analyses of pigments, dyes and colouring agents, including the identification of organic dyes in paper, prints and inks. Further, the authors present several case studies and the outlook for Raman spectroscopy development and utilisation.

Authors: Howell G. M. Edwards, Peter Vandenabeele, Philippe Coloban

Publisher: Springer
1st ed., October 2022
ISBN: 978-3-031-14378-6
531 pages, 1 image
Hardcover
Available also as an eBook



Cut/Copy/Paste Fragments from the History of Bookwork

The author defines the task of this book as tracking how the past is constantly being de- and re-composed by the present. The work investigating the potential of changing media environment for the future of writing and publishing in the humanities uses case studies from England between the 1630s and the 1710s. In particular, the focus is on the so-called radical bookwork – the assemblages of cut and pasted materials. The first chapter deals with the elaborate collages of pieces sliced from printed Bibles made by the women at Little Gidding, a religious household, examining the typographical means and navigation tools used to enhance the reading experience. The second chapter is dedicated to books of poetry assembled in the domestic printing atelier of Edward Benlowes. The third one explores the History of the Book by John Bagford, with exemplary specimens of early text technologies acquired through an extensive gathering of waste books and their fragments. In all three cases, the present book also points to past misinterpretations of the subjects, drawing on archival evidence and scholarly works. The open-access online edition includes numerous digital assets and resources.



Author: Whitney Trettien

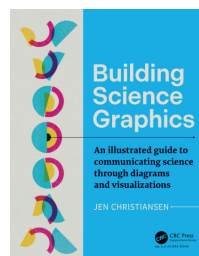
Publisher: University of Minnesota Press
1st ed., February 2022
ISBN: 978-1-5179-0408-1
328 pages, 70 images
Hardcover
Available also as an eBook

Building Science Graphics An Illustrated Guide to Communicating Science through Diagrams and Visualizations

The approaches to creating informative graphics presented in this new book with well-chosen illustrations and many real-life examples are of interest to all who need to visualise scientific facts and results, whether they are designers or researchers. The first part explains all fundamental concepts and principles related to science graphics and visual communication, from perception and storytelling strategies to layout and style, up to suitable tools and their use. The second part discusses special considerations for science graphics and their types. The third part guides the reader through the process of building graphics, from setting the goal and researching content to creating sketches, up to the final illustration, its review and possibly later adaptation for different purposes. The fourth part clarifies the possibilities and benefits of creative and critical collaboration.

Author: Jen Christiansen

Publisher: CRC Press
1st ed., December 2022
ISBN: 978-1-03-210940-4
357 pages, 265 images
Hardcover
Available also as an eBook



to improve supply chain resiliency, cybersecurity, logistics and life on the factory floor and describes big data, sensors for the industrial Internet of Things, artificial intelligence, machine learning, computer vision, networking for mobile edge computing and edge computing as such, 3D printing and additive manufacturing, and robotics. Also, it discusses growing opportunities for women in smart manufacturing and provides eight case studies.

Nordic Design Cultures in Transformation, 1960–1980 Revolt and Resilience

Editors: Kjetil Fallan,
Christina Zetterlund, Anders V. Munch



Publisher: Routledge
1st ed., August 2022
ISBN: 978-1032290423
244 pages, 55 images
Hardcover
Also as an eBook

This work shows how discourses, institutions and practices transformed in the studied period due to profound changes in virtually all conditions relevant to the design, including the transition from traditional layout and typesetting to computerised processing in the printing industry.

Engineering Psychology and Cognitive Ergonomics

Editors: Don Harris, Wen-Chin Li



Publisher: Springer
1st ed., May 2022
ISBN: 978-3031060854
523 pages, 204 images
Softcover
Also as an eBook

These proceedings include almost 40 papers from the 19th International Conference on the title topic, for example dealing with the eye-tracking study of the effect of typesetting applications on user manipulation of fractions, aesthetic preference in the composition ratios and the influence of font size, contrast, and weight on text legibility for wearable devices.

Materials for Additive Manufacturing

Authors: Yusheng Shi, Chunze Yan,
Yan Zhou, Jiamin Wu, Yan Wang,
Shengfu Yu, Chen Ying

Publisher: Academic Press
1st ed., February 2021
ISBN: 978-0128193020
774 pages
Softcover
Also as an eBook



This extensive volume covers the composition, preparation, properties and processing considerations of polymers in powder, liquid and filament forms, as well as metallic and ceramic materials. Also, it discusses application cases for additive manufacturing materials and materials for 4D printing.

Nature-Inspired Structured Functional Surfaces Design, Fabrication, Characterization, and Applications

Author: Zhiwu Han

Publisher: Wiley-VCH
1st ed., July 2022
ISBN: 978-3527350216
320 pages
Hardcover
Also as an eBook



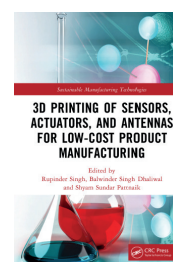
The author of this book briefly introduces the advanced bionic materials, definition and classification of nature-inspired functional structural surfaces, typical prototypes with such surfaces and methods for their characterisation, analysis, modelling and fabrication. Each of the following chapters deals in detail with an individual type of bio-inspired structural materials: light-trapping surfaces, transparent antireflective surfaces, antifogging surfaces, structural colour surfaces, oil-water separation materials, underwater superhydrophobic multifunctional surfaces, and responsive surfaces toward multiple organic vapours. Many of these materials are inspired by insects, often by butterfly wings; other natural models include fish scales or gecko feet, among others.

3D Printing of Sensors, Actuators, and Antennas for Low-Cost Product Manufacturing

This book tracks recent development and innovations of 3D-printable smart materials concerning their potential application for the manufacturing of sensors, actuators and antennas using low-cost 3D printing processes, highlighting those that are commercially available or can be easily prepared. The book comprises eight chapters. The text introduces 3D-printed antennas, reviews the related research published in the last few years and presents suitable materials, processes and different types of antenna design. Further, it discusses polymer-based solutions for low-cost product manufacturing, where also screen printing and inkjet printing can be used among fabrication methods, and economic and environmental justification of lab-scale solutions for sensors, actuators and antennas. The remaining chapters deal with flexible and wearable patch antenna using additive manufacturing for wireless applications, 4D-printed smart devices and a case study on developing polymer composite for sensors, actuators, and antennas.

Editors: Rupinder Singh,
Balwinder S. Dhaliwal, Shyam S.Pattnaik

Publisher: CRC Press
1st ed., February 2023
ISBN: 978-1-03-204680-8
170 pages, 87 images
Hardcover
Available also as an eBook



Thermally Activated Delayed Fluorescence Organic Light-Emitting Diodes (TADF-OLEDs)

This volume brings a comprehensive overview of the devices in focus. It begins with the early history of organic light-emitting diodes and the materials enhancing their efficiency through the mechanism of thermally activated delayed fluorescence. Then, it explains its fundamental theoretical principles and concepts and also introduces the aggregation-induced delayed fluorescence. Three chapters detail the advanced devices emitting in different spectral ranges, namely the highly efficient and stable blue thermally activated delayed fluorescent organic light-emitting diodes and the recent progress in thermally activated delayed fluorescent emitters for the long-wavelength region (orange, red and near-infrared) and high-performance white organic light-emitting diodes. Further, the text discusses the advantages of using materials with thermally activated delayed fluorescence for sensitising different types of dopants, formation and use of exciplexes and their use as emitters and hosts, applications of thermally activated delayed fluorescence aside from organic light-emitting diodes and future outlook.

Editor: Lian Duan

Publisher: Woodhead Publishing
1st ed., October 2021
ISBN: 978-0-12-819810-0
488 pages
Softcover
Available also as an eBook



Bookshelf

Academic dissertations

On Droplet Microfluidics and Security Feature Microfabrication with Scalable Electrohydrodynamic Nanoprinting

This thesis deals with electrohydrodynamic nanoprinting, seen as a promising technology with great potential thanks to its high resolution and additive material processing. In particular, the thesis explored its application for microfluidics and security printing of novel multi-material ink systems. Further, it contributed to upscaling the process by developing a chip-based multi-nozzle printhead.

The introduction briefly reviews the micro- and nanostructuring techniques, which employ resist-based lithography, direct writing or inkjet printing, and provides the background on electrohydrodynamic printing. That includes the typical modes of the liquid ejection, applications for high-resolution manufacturing and microfluidics, and fabrication of glass capillary nozzles for electrohydrodynamic printheads with their limitations and the need for better-defined and more efficient multi-nozzle printheads. The main body of the text is divided into three chapters presenting the individual areas of work. First, the research focused on the coalescence dynamics of the sessile droplets to demonstrate an open-atmosphere microfluidic platform with omnidirectional droplet propulsion. The chapter describes the observed behaviour, provides theoretical analysis and presents the results, including the supplemental videos with self-propelled droplets travelling through a maze and picking up, transporting and merging solid particles. Further, the electrohydrodynamic technology was used for fabricating radiative, lifetime-encoded security tags with nanoprinted colloidal perovskite nanocrystals. Besides other details, the chapter presents the preparation of special quantum dot inks and the detection method for the decryption of resulting quick-response codes. Finally, to overcome the throughput limitations, the work dealt with the development of printheads based on a micro-electro-mechanical system (MEMS). The corresponding chapter describes the proposed design and microfabrication, characterisation of the printing behaviour of a single nozzle on MEMS printhead, and printing of fluorescent nanoparticle inks and silver conductive lines using both single-nozzle and multi-nozzle array printing. Also, it discusses the issues and challenges encountered with the MEMS printhead chip.

Development of a Method for Bio-Inspired Colouring of Surfaces by Imitating Structural Colours

The research focus of this thesis was on the optical properties of biological structural colours, with the goal of using them for the development of functional surfaces with such properties. Structural colours have intense colourfulness, multi-colour, metallic, and iridescent effects, as well as the ability to achieve a matt or glossy appearance. These properties result from the interaction of the incident light with the special nanoscale structures of the surface. The aim was to develop a method to make existing research on biological structural colours accessible for interdisciplinary transfer into technical applications of bionic structural colours. This method enables an efficient implementation of the optical properties for bioinspired colouration

Doctoral thesis – Summary

Author:

Jana Chaaban

Speciality field:

Additive Nanomanufacturing

Supervisor:

Dimos Poulidakos

Defended:

18 December 2020, ETH Zurich, Laboratory of Thermodynamics in Emerging Technologies Zurich, Switzerland

Contact:

jana.chaaban@himt.ch

Further reading:

DOI: 10.3929/ethz-b-000502765

Doctoral thesis – Summary

Author:

Heike Gute

Speciality field:

Printing Science and Technology

Supervisors:

Edgar Dörsam

Michael Heethoff

Defended:
5 October 2021, Technical University of
Darmstadt, Department of Mechanical
Engineering, Institute of Printing
Science and Technology
Darmstadt, Germany

Language:
German

Original title:
*Entwicklung einer Methode zur
bioinspirierten Farbgebung von
Oberflächen durch Imitation
von Strukturfarben*

Contact:
heikegute@gmx.de

Further reading:
DOI: 10.26083/tuprints-00020356

of surfaces. It is based on the imitation of the physical properties of the biological structural colours. For the implementation, the method instructs in choosing technical processes, such as printing and finishing. The dissertation describes how bionic structural colours can be systematically developed and how to find suitable processes for technical implementation. First, it summarises the fundamental concepts related to light, colour and its perception by the human visual system and the reproduction of colour by printing technology, including special colour effects produced by dedicated finishing processes. Next, it analyses the literature on structural colours in biology and the usage of these in product and process development. The possibilities of functionalisation by surface structuring and the current state of the art, in general and specifically for structural colours, are also discussed. Then, a classification of biological structural colours is presented, which serves as a basis for the biologically driven development of bionic applications. Finally, the method for bionic structural colours is introduced, with the example of colouring surfaces inspired by the colour system of butterflies of the genus *Morpho*. An abstracted model is introduced and used for the technology transfer. The proposed system for the *Morpho* example combines diffuse reflection, multilayer interference, diffraction, and absorption in a suitable layered composite, to create the desired blue colour effect.

Doctoral thesis – Summary

Author:
Sani Yakubu Adam

Speciality field:
Book History

Supervisor:
Shamil Jeppie

Degree conferral:
23 March 2022, University of
Cape Town, Faculty of Humanities,
Department of Historical Studies
Cape Town, Republic of South Africa

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Further reading:
<http://hdl.handle.net/11427/36430>

A History of the Kano Book Market, c. 1920–2020

This thesis studied the history of the book market in Kano, one of the oldest cities in northern Nigeria, during the last hundred years. Drawing on archival evidence, comprising research, public and private records, and in-depth interviews, the presented work contributes to the research on Arabic printing and book distribution beyond the global centres of Islamic literature while also dealing with popular literature in the Hausa language.

The main content of the dissertation is organised into eight chapters. The first introduces the Kano book market, reviews book history in Western and African scholarship, presents the approach of the work and outlines the history of book production in sub-Saharan Africa. Two chapters describe the traditional reading community in northern Nigeria, its reshaping due to colonial policies and the evolution of the modern reading community. The fourth chapter examines the geography of the Kano book market in the pre-colonial period and under the British administration that introduced the dual city project, with Arabic and Islamic book markets mainly within the walled city and the English and Hausa book markets in the township. Also, it discusses distribution channels of Islamic, English and Hausa book markets and the current growth related to the increase in the population and the number of schools. The following three chapters are dedicated to the Kano Islamic book market, focusing on the role of authors, copyists, distributors, publishers and printers, including background on the Kano printing industry from the appearance of printing presses by the beginning of the 20th century to the recent expansion thanks to the Hausa booksellers. Besides the local perspective, the text deals with the transnational book trade between the Middle East and sub-Saharan Africa. The last chapter details the transformation of the Hausa book trade in the period studied. That includes the state control during the colonial era, which continued after independence through the state-owned publishers, the changes induced by the growing demand for Hausa popular literature in the 1980s and the emergence of Kano as the centre of the new literature. The text also mentions the challenges suffered in the late 1990s, overcome in the new millennium, the gradual dominance of female authors, and the impact of new media.

Events

Optical & Digital Document Security

 Prague, Czech Republic
17–19 April 2023


Held for the second time, this technical conference for physical, digital and virtual document security successfully combines two former Reconnaissance events. This year's programme opens the afternoon seminar discussing the use of smartphone solutions for digital transactions, authentication and related services, addressing the balance between their efficiency, convenience and security and also considering emerging technologies in this application area. The sessions on the next two days focus, for example, on new approaches to document security and protecting identity. The topics include novel magnetic codes, new techniques improving the process of banknote design, such as the software assessing the perception performance, robust micro- and nano-security elements, experiences with counterfeits of digital security features, and new security features protecting the portrait against manipulations. Two sessions are dedicated to new optical techniques for security, presenting the structural colours, anti-counterfeiting imaging device based on microlens array, NIR-induced colour and fluorescence changing inks, design of diffractive optically variable image devices in a non-orthogonal, spiral-based coordinate system, licence plate authentication with liquid crystal printing, and more.

GlassPrint 2023


 Düsseldorf, Germany
25–26 April 2023

The presentations announced for the 2023 edition of this conference deal with hybrid machines for direct-to-shape printing, product personalisation options, prerequisites for standardisation and consistent quality in screen printing and inkjet printing on glass, the direct exposing technology for efficient screen making, new opportunities for screen printing on glass, functional inkjet printing, advanced patterning techniques, including magnetic print patterning, important process parameters and benefits of the UV-LED curing technology, decoration materials for hollow glassware, and also special solutions for bird-friendly glass.

IMI events

 In the spring months of this year, IMI Europe offers the Inkjet Ink Characterisation Practical Course (17–20 April 2023 in Harston, UK) with an option to register for the additional open lab session to test the own samples and the event providing an overview of the progress in materials, technology and other solutions, the Inkjet Development Conference 2023 held on 10–11 May in Hamburg, Germany. A week later, as the American counterpart, the Inkjet Innovation Academy (16–17 May) and the Inkjet Conference 2023 (18–19 May) take place in Orlando, Florida, USA.

Forum & INFOFLEX 2023

 Columbus, Ohio, USA
16–19 April 2023


The topics discussed in 2023 at this traditional event of the Flexographic Technical Association encompass the strategic aspects related to sustainability, effective collaboration and finding new employees, as well as the essential elements of flexographic production, from colour management to mounting tapes.

ICC Meeting

London, UK
25 April 2023

The open, free-to-attend session organised during this International Color Consortium meeting offers invited lectures dealing with colour matching functions, colour naming for colour management, colour management for 3D printers, iccMAX, and bridging the gap between image quality and image aesthetics.

Innovations in Publishing, Printing and Multimedia Technologies 2023

 Kaunas, Lithuania
26–27 April 2023

This established international event is organised by the Department of Media Technologies at the Kauno kolegija Higher Education Institution. The 2023 edition is held in a hybrid format. It combines the conference sessions on the first day with the activities for students on the other day, which are this year led by experts from Belgium, Portugal, Mexico and USA. The plenary talks look into the future of media communication and education. Other topics range from the printing of conductive ink to the video editing speed up to the artificial intelligence impacts.

INMA World Congress of News Media

New York City, New York, USA
22–26 May 2023

The World Congress week begins with the two days reserved for the study tours of New York, which is followed by one day offering workshops on product innovation, digital advertising, subscriptions growth, smart data, and newsroom leadership. The sessions of the Media Conference are scheduled for the last two days, ending with the Global Media Awards Dinner.



Now23

Paris, France
3 June 2023



This new annual conference on typography and design is organised by TypeParis and replaces the TPTalks launched in 2015. The announced topics deal, for example, with handwriting fonts, rediscovering Greek letterforms, and reasons for developing more typefaces.

Print Matters for the Future

Riga, Latvia
9 June 2023



This annual Intergraf event is this time organised jointly with the Nordic Printing Association. Besides developments in different market segments and countries, the talks address web printing challenges, carbon footprint, and more.

IS&T events

The upcoming events presented by the Society for Imaging Science and Technology include



Archiving 2023, which takes place on 19–23 June in Oslo, Norway, and London Imaging Meeting held jointly with the Institute of Physics a week later (28–30 June) in London, UK.

CPES2023

Montreal, Canada
17–18 May 2023



The programme announced for this event organised by the IntelliFLEX Innovation Alliance consists of four sessions with oral and poster presentations dedicated to basic and applied research, commercialisation of innovative solutions and future markets. The topics include special solution-processed organic sensors, the printing of fine lines, micro-solid printing technology, sustainable electronic products design, upscaling and more. The 2023 edition is held in a hybrid format.

Color Impact 2023

Rochester, New York, USA
11–16 June 2023



This event of the Inter-Society Color Council is held in conjunction with the 40th Anniversary Celebration of the Munsell Color Science Laboratory at RIT. The theme of the conference is 'Color and Human Experience'. The main programme is scheduled from Monday to Thursday, and each day starts with a keynote. The speakers are Domicile Jonauskaitė sharing the scientific findings from the international colour–emotion association survey with over 15 thousand participants, which reveal the links between colours and emotions across cultures and individuals, Kory Stamper exploring the communication gap between the colour specialists and the public with a focus on the role of the 20th-century American dictionaries, Peter Donahue presenting 'TikTok as Color Theory's One-Room Schoolhouse', and Roy Berns providing the digital photography and imaging software essentials helping to reproduce the artwork in good quality. The topics of presentation sessions include colour response, history, art and design, education, technology, colour experience, colour in the environment, printing and reproduction. The programme offers a variety of short courses, tours and other activities in the afternoon, as well as special evening events.

HOPV23

15th Conference on Hybrid and Organic Photovoltaics

London, UK
12–14 June 2023



The three-day programme of this established event again features numerous contributions documenting the progress in the field. The lectures and poster presentations review the past development of next-generation solar cells and share the recent advances, such as the novel printable conductive graphene electrodes for highly efficient perovskite solar cells, the chiral low-dimensional perovskite and bifacial fully printable perovskite solar cells. Several sessions deal with upscaling; the papers present, among others, the self-assembly strategy, the benefits of implementing the in-situ optical analysis of the printing process and different approaches to roll-to-roll compatible and all-printed designs.