



AITRIZ**CON**2018-**II**

BOOK of ABSTRACTS

TianJin City, China

11-12 August 2018



ABOUT THE CONFERENCE

Tianjin is a metropolis in northern coastal China and one of the four national central cities of the country, with a total population of 15,469,500, the fourth largest in the country. The walled city of Tianjin was built in 1404. As a treaty port since 1860, Tianjin has been a major seaport and gateway to Beijing. Nowadays Tianjin is a new growth pole in China and is a hub of advanced industry and financial activity. Many of the Fortune 500 companies in the world have set up base in this city.

TRIZ as a methodology for creativity and innovation has been disseminated for more than 15 years in Tianjin. The National Engineering Research Center for Technological Innovation Method and Tool of China is also located in the city, which is only one national research platform for studying and disseminating TRIZ in industries in the country. There are better environment for holding an international TRIZ conference in Tianjin.

For the purpose of open presentations, discussions and communications on the TRIZ, its development and application in industries. The China Branch of The Altshuller Institute For TRIZ Studies is going to hold International Conference: AI TRIZCON 2018-II in Tianjin. Every One who is interested in TRIZ is welcome to your contribution to the conference.

We invite several experts, TRIZ Masters, in the world as Keynote Speakers to show frontiers for further development of TRIZ and its dissemination. We also invite innovative engineers in China to show their achievements of TRIZ application in industries.

CONFERENCE SCHEDULE

Venue: Holiday Inn Tianjin Riverside

Date	Time	Program	Location
2018/ 8/11 Sat.	08:00- 08:30	Registration	River Side Hall (5 th floor)
	08:30- 09:00	Opening Ceremony Welcome Speeches 1、 By: Yuan Zhou · Secretary of China Innovation Method Society 2、 By: Lizhu Zhang · Vice Chairman of Tianjin science and technology association 3、 By: Jianhong Zhang, Vice-director of Resource allocation and management office, Department of Science and Technology of Hebei Province Host: Runhua Tan	
	09:00- 09:20	Group Photo	lobby (1 st floor)
	09:20- 09:30	AM Break	
	09:30- 10:10	Keynote A: Seeing Tomorrow Today: Knowing your customers' needs before they are aware of them. By: Victor Fey, TRIZ Master, President of The TRIZ Group, LLC Host: Runhua Tan	River Side Hall (5 th floor)
	10:10- 10:50	Keynote B: Integration of TRIZ into Innovation Culture By: Zinovoy Royzen · TRIZ Master · President of TRIZ Consulting, Inc Host: Kyeongwon, LEE	
	10:50- 11:20	Keynote C: TRIZ++ for Patent Circumvention, Regeneration, and Enhancement By: Daniel Sheu, Professor, National Tsing Hua University, Taiwan China Host: Kyeongwon, LEE	
	11:20- 11:40	Keynote D : TRIZ in China: Characteristics, Opportunities and Challenges By : Haiyan Wang · Professor, UCAS(University of Chinese Academy of Sciences) Host: Kyeongwon, LEE	

11:40-12:00	Special talk A: Introduction of Innovative Method Work in Hebei Province By : Jianfeng Gao, Director of Hebei institute of scientific and technological information Host: Kyeongwon, LEE		
12:00-13:00	Lunch	Cafe Venice (2 nd floor)	
13:00-13:40	Keynote E: Theory and Practice of Perspective Education By: Marat S Gafitulin, TRIZ Master · Business consultant Host: Isak Bukhman	River Side Hall (5 th floor)	
13:40-14:10	Keynote F: TRIZ and Design thinking activities in Korea By: Kyeongwon, LEE, Full professor · Korea Polytechnic University Host: Daniel Sheu		
14:10-14:40	Special talk B: A domino for Root Conflict Analysis (RCA+) — Uniting the best features of Root Conflict Analysis (RCA+), Root Cause Analysis (RCA) and reasoning in terms of Functional Chains into a single approach By: Justus Schollmeyer, Ph.D, Cofounder of Second Negation, Berlin, Germany Host : Daniel Sheu		
14:40-15:00	PM Break		
15:00-15:20	Special talk D : Explorations on Computer-aided Innovation Education By : Huangye Li · Ph.D, IMA-InnoCloud (Beijing) Technology Co., Ltd.; Ying Zhu · Shanghai HiFox Technology Co., Ltd. Host: Isak Bukhman		
15:20-15:40	Special talk C:TRIZ competition in universities of China By : Yongzhi Wu, Professor, Institute of science and technology information of Heilongjiang Province Host: Guozhong Cao		
15:40-16:00	Special talk E: Research and Education Based on TRIZ in Hunan University By : Jiangnan Liu, Professor, Hunan University Host: Guozhong Cao		
18:00	Welcome Banquet		Grand Ball Room (5 th floor)

2018/ 8/12 Sun.	08:00- 08:30	Registration	
	08:30- 09:10	Keynote G: Trend of TRIZ Application in Industries in the World By: Isak Bukhman, TRIZ Master, Consultant of TRIZ Solutions LLC, President of Altshuller Institute for TRIZ Studies Host: Runhua Tan	
	09:10- 09:40	Keynote H: TRIZ for industrial companies By : Marat S Gafituln, TRIZ Master · Business consultant Host : Huangye Li	
	09:40- 10:10	Keynote I : University Teacher' s Guide to Conduct TRIZ Based Innovative Activity Learning for Students By : Galina Terekhova , Associate Professor, South-Ural State Humanitarian Pedagogical University Host : Huangye Li	
	10:10- 10:30	AM Break	River Side Hall
	10:30- 11:00	Keynote J :TRIZ applications in Hi-Tech High Volume Manufacturing By: Anatoly Agulyansky, Ph.D, Sr. Staff Engineer in Intel Israel Host : Jiangnan Liu	(5 th floor)
	11:00- 11:20	Special talk F: Functional Design Based on Effect in TRIZ By : Guozhong Cao, Professor, Hebei University of technology, China Host: Jiangnan Liu	
	11:20- 11:40	Special talk G: Mutual promotion of talent cultivation and economic benefits based on TRIZ in Guangdong province By : Jie Yang, Associate Professor, Guangdong University of technology, China Host: Jiangnan Liu	
	11:40- 12:00	Special talk H: The application of innovation method in Tasly By : Wei Zhang, Director of project management center, Tasly Holding Group Host: Jiangnan Liu	
	12:00- 13:00	Lunch	Cafe Venice (2 nd floor)
13:00- 13:20	Special talk I: Discussion on the application of TRIZ in non-technical fields	River Side Hall	

	By : Bing Han, Tianjin Innovation and Development Institute Host: Isak Bukhman	(5 th floor)
13:20- 13:40	Special talk J: Impact and scenarios of analogy in mechanical design By : Lizhen Jia, Ph.D,Civil Aviation University of China, China Host: Isak Bukhman	
13:40- 14:20	Keynote K : The Major Research Areas Related To TRIZ In The NER- Center By: Runhua Tan, Professor, Vice President of Hebei University of Technology and Chair of China TRIZ Association Host: Isak Bukhman	
14:20- 14:50	Closing Announcements Host: Isak Bukhman and Runhua Tan	
14:50- 16:30	Optional campus & National Research Center tour (Hebei University of Technology)	

Seeing Tomorrow Today: Knowing your customers' needs before they are aware of them

By: Victor Fey

TRIZ Master, President of The TRIZ Group, LLC, USA
fey@trizgroup.com

Biography:

Victor Fey has over 35 years' experience in TRIZ research, training and application. Since The TRIZ Group's inception in 1995, Victor has collected more than two decades of consulting experience serving the Global 1000. In this innovation consulting capacity, Victor's work has ranged the gamut from teaching, coaching and consulting, to facilitating and leading cross-functional teams in delivering critical breakthrough product and technology solutions. Only at Hyundai-Kia Motors, his consulting effort resulted in obtaining over 100 patents with an estimated ROI of \$100 million.

From 1997 through 2014, he was an Adjunct Professor at Wayne State University, where he taught the first graduate-level course in TRIZ in the West. He has lectured on the subject at MIT, Stevens Institute of Technology, Chalmers University, Technion, and others. He chairs the Education Committee of the Altshuller Institute, as well as the Committee for TRIZ Development of the International TRIZ Association's R&D Council.

His books include *Effective Innovation: The Development of Winning Technologies*, published by ASME Press in (co-authored with Don Clausing of MIT), and *Innovation on Demand: New Product Development Using TRIZ*, released by Cambridge University Press (penned with Eugene Rivin; it was translated into Korean, and a Chinese translation is scheduled for 2019).

Abstract:

One of the most vital applications of TRIZ is helping businesses identify and prioritize the best innovation opportunities. Innovation is not a goal – it's a tool to achieve specific business objective, but it's effective only if it satisfies a need or creates a new one. Predicting, as well as shaping, future customer needs is imperative for business success in the increasingly competitive marketplace. Conventional TRIZ tools used for product and technology forecasting – primarily,

lines of evolution and S-curve analysis – do not explicitly address the need dynamics. TRIZ can predict the next stage in the product's evolution (e.g., its increased flexibility), but it does not answer the question, "Why would the market need this innovation?"

This presentation will describe a new product forecasting approach that takes into account need dynamics. This approach allows for more reliable identification and prioritization of the best innovation opportunities, both short- and long-term. Specific guidelines on the use of need dynamics for the development of new products and services will be provided.

Integration of TRIZ into Innovation Culture

By: Zinovy Royzen

TRIZ Master, President of TRIZ Consulting, Inc
zroyzen@trizconsulting.com

Biography:

Zinovy Royzen is a Master of TRIZ certified by Genrich Altshuller, the creator of TRIZ. He is the founder and President of TRIZ Consulting, Inc., Seattle, Washington, the first company in USA provided TRIZ services for education, projects creation and related problems solving. Zinovy was a cofounder of Altshuller Institute for TRIZ Studies (AI) and its VP and member of AI Board of Directors for many years.

He is one of leading TRIZ consultants, project facilitator, trainer, and TRIZ developer. He has taught thousands of engineers including more than two thousand engineers at Boeing. Royzen Zinovy has been applying TRIZ to new product development, quality improvement, cost reduction, and inventive problem solving since 1980. He has been developing and teaching TRIZ since 1984.

He has led workshops and/or provided consultation at numerous organizations, including Boeing Co., Eastman Kodak, Ford Motor Company, Harley-Davidson Motor Company, Hewlett-Packard, Illinois Tool Works, Ingersoll Rand, Kimberly-Clark, LG Electronics, Lucent Technologies, National Semiconductor, NASA, Paccar, Philips Semiconductors, Samsung, Siemens, Thermo King Corporation, and Xerox.

Royzen conducted his TRIZ courses for UCLA Extension in 1997-2014. He also conducted his courses at University of Washington and National University of Singapore. He is a MS in mechanical engineering, the author of many TRIZ papers and holds 32 patents.

Abstract:

Innovation is critical for companies' survival and success. Innovation in its turn depends on the quality of new concepts. As a result, the methods used to develop new concepts for product and process development are becoming the keys for success. Companies introducing TRIZ are developing higher quality of concepts and develop these ideas faster than ever before. Zinovy Royzen has almost three

decades of experience in introduction of TRIZ to corporations and helping them to integrate TRIZ into culture of innovation. There are many success stories and also lessons learned to achieve high results meeting and exceeding companies' expectations.

TRIZ++ for Patent Circumvention, Regeneration, and Enhancement

By: Daniel Sheu

Professor, National Tsing Hua University, Taiwan China
dsheu@systematic-innovation.org

Biography:

Daniel has 9 years of industrial experience primarily in the electronic industries with Hewlett-Packard, Motorola, and Matsushita prior to joining Tsing Hua University in which he has 23 years of academic experiences. He has been invited to deliver keynote/plenary speeches 12 times in international conferences and 15 times in national conferences. Daniel has developed some 20 new TRIZ tools and successfully facilitated industrial teams to solve more than 70 real-world industrial problems which otherwise persisted for multiple years. Daniel published 44 peer reviewed journal papers, 167 conference papers. He authored 8 books, translated 4 books, and hold 7 utility patents. Daniel Sheu holds a B.S.M.E. degree from Taiwan University and an M.S.M.E. degree from State University of New York at Buffalo. He also holds a Ph.D. in Engineering from UCLA and an MBA degree from Northwestern University.

Abstract:

According to statistics, China paid 18 billion US dollars of patent loyalty to foreign countries each year yet received only 6% of it as loyalty from foreign countries. How to effectively circumvent patents is an important issue.

Most people focus their efforts on using legal or textual approaches to achieve patent circumvention, this talk will focus on technical analysis of patents which enable us not only to circumvent patents but also to have opportunities to regenerate patents from an existing patent and/or enhance a patent in order to encompass. With this set of proposed approaches, it is possible to convert a patent loyalty payments into patent revenue items.

TRIZ in China: Characteristics, Opportunities and Challenges

By: Haiyan Wang

Deputy dean, Professor of School of Public Policy and Management,
UCAS (University of Chinese Academy of Sciences)
wanghy@ucas.ac.cn

Biography:

Mainly focus on innovation methods and innovation policy research. Has participated in the research on China's Medium and Long-term Science and Technology Development Plan (2006-2020), and has undertaken both the 12th five-year plan and the 13th five-year plan research on NIS and the system reform of science and technology. In the last ten years, has undertaken eight special research projects on innovative methods. She established the Research Center for Innovative Methods of UCAS, which promoted the research and teaching of TRIZ and other methods for innovation.

Abstract:

Innovation Method being a government-sponsored work has experienced ten years of research and promotion in China, has now formed a very large research and application extension system and network, and has achieved great performance. TRIZ is one of the core elements of this work. At present, China is facing industrial restructuring and economic transformation. How can this work continue to play a role in such a background? How to combine the research, application and popularization of TRIZ with the research practice of the enterprise, how to combine with the education, how to combine with the ability of the scientific research personnel? It is facing new opportunities and challenges.

Introduction of Innovative Method Work in Hebei Province

By: Jianfeng Gao

Director of Hebei institute of scientific and technological information

Biography:

Gao Jianfeng, the Party committee secretary and dean of Hebei Institute of Scientific and Technical Information, graduated from Hebei University of Technology in 1993 with a bachelor degree in automation and received a master degree in Food Science and Engineering from Hebei Agricultural University in 2005.

He has long been engaged in science and technology management, development strategy and compilation of policies and regulations. As a core member of the drafting group, he participated in and completed the following works, Hebei Committee of the Communist Party of China The People's Government of Hebei Province's Decision on Accelerating Scientific and Innovative Construction of Innovative Hebei Province, Hebei Deepening Scientific and Technical System Reform Implementation Plan, Hebei Promoting Scientific and Technical Achievements Transformation Regulations, etc.. He also organized and carried out Hebei Science Popularization Resources Originality and Data Sharing Public Service Platform and Hebei Enterprises Research Development Costs Pre-Tax Super Deduction Item Identification Information Management System, etc.

Abstract:

Introduction of innovative method work in hebei province, including the economic development, the origin of innovative methods, main practices, achievements and future plans in hebei province.

Theory and Practice of Perspective Education

By: Marat S Gafitulin

TRIZ Master, Business consultant
mgafitulin@gmail.com

Biography:

Business consultant, Master of TRIZ (Diploma No. 14), PhD pedagogical sciences, inventor

The main area of activity is the development and consulting in the sphere of innovations for industry and education.

2001-2003 - was the president of the International TRIZ Association.

Abstract:

One of the key problems of the modern education system is considered - this is the increasing discrepancy between the required and the proposed education. In the language of TRIZ, there is a social contradiction. The analysis of the situation has shown that two factors are at the heart of this contradiction. The first factor is the accelerated speed of technical and technological advancement of the society, requiring a new education of citizens. The second factor is a morally obsolete reproductive model of education, which no longer provides the educational demand from the society.

Where is the way out of this situation? What is the perspective way of development of the education system? What is the theoretical model of prospective education? What practical steps have been taken to implement the perspective education? What are the results?

TRIZ and Design thinking activities in Korea

By: Kyeong won, LEE

Full Professor, Korea Polytechnic University
lkw@kpu.ac.kr

Biography:

Founder of KATA (Korea Academic TRIZ Association) in 2010, that was now extended to KOSCA (Korea Society of Creativity Application, www.kosca.net) since 2016

TRIZ research professor at INSA Strasbourg, France (2013), Wayne State Univ. U.S.A. (2004)

Post doctoral visiting scholar at Stanford Univ. U.S.A. (1994),

Graduated from Seoul National Univ. (B.S. in 1986) and KAIST (Master in 1988, Ph.D. in 1993)

Learned the conventional TRIZ at LG Electronics in 1996 by Russian TRIZ experts

Secretary General of Korea study group on Design thinking (since 2014)

Abstract:

South Korea is the most active country on TRIZ applications in the world. At this keynotel speech the presentator explains the effective strategy to introduce and propagate TRIZ into companies such as SAMSUNG, LG, SK Hynix semiconductors, Hyundai Motors etc. through some experiences in South Korea from 1995.

He introduces how and why the TRIZ activities have declined slowly these days and then, converged with the Design Thinking process that have made at d.school, Stanford University since 2016. These days the Design thinking process with TRIZ and Patent/information search in other fields with similar problems for systematic innovation was started to be popular since 2016.

The Korea-style design thinking process with simplified TRIZ and business model canvas (K-Design thinking process like K-Pop) is developed and spread in Korea. The effective strategy to promote and practice TRIZ and Design thinking in companies through findings and lessons learnt from Korean practices may be very helpful to Chinese TRIZ experts and professors.

A domino for Root Conflict Analysis (RCA+)

— Uniting the best features of Root Conflict Analysis (RCA+), Root Cause Analysis (RCA) and reasoning in terms of Functional Chains into a single approach

By: Justus Schollmeyer

Ph.D, Cofounder of Second Negation, Berlin, Germany
justusschollmeyer@gmail.com

Biography:

Justus Schollmeyer (1984) studied philosophy at the Freie Universität Berlin and at the Sorbonne Paris IV. He created a branch for TRIZ research at the Leibniz Institute for Interdisciplinary Studies, where he is working on the logic of engineering methods for resolving system contradictions (TRIZ) and on its interdisciplinary application. The results directly affect his PhD project on sustainable organisation development supervised by Prof. Georg Müller-Christ at the University of Bremen. The aim of this dissertation is the development of effective methods for uncovering and resolving system contradictions with regard to issues of sustainability. In this way, the theory for coping with dilemmas of resource-oriented management is to be supplemented by adequate problem solving tools. In 2018, Justus cofounded Second Negation, a consulting organisation for developing and delivering ARIZ-based workshops for resolving system contradictions of sustainability.

Abstract:

The Theory of Inventive Problem Solving (TRIZ) is known for its strengths in articulating and resolving system contradictions (the root causes of unfortunate tradeoffs). Knowing that most difficult problems seem to be unsolvable only because of hidden unjustified assumptions underlying the initial problem statement, TRIZnics invest much time and effort into rigorous problem analysis and articulation. As a consequence, one vector of the development of TRIZ consists in the development of efficient problem-analytical tools. For example, in the late 1990s, Root Conflict Analysis (RCA+) was developed by merging ideas from TRIZ and from the Theory of Constraints. Our paper presents an

improvement on this method by further constraining the way of articulating cause-effect-cause chains with the help of a methodology inspired by an old Chinese game known as Domino. Since the cause-effect-dominoes require more rigorous formulations of the actual cause-effect-chains, both (i) the formulation of the logical nature of the problem and (ii) the underlying functional chains will become more explicit (compared to conventional RCA+ or RCA). This will be shown by discussing both (i) the successful application of this approach in an industry project and (ii) an example of conventional RCA+ from the literature.

Explorations on Computer-aided Innovation Education

By: Huangye Li, Ying Zhu

(1) Huangye Li

Ph.D, IMA-InnoCloud (Beijing) Technology Co., Ltd.
oleg.li@ima-innocloud.com

Biography:

Li Huangye, Phd, Sait-Petersburg State University of Engineering and Economics, Level-3 Expert of the International TRIZ Association. Now he is CTO of IMA-InnoCloud (Beijing) Technology Co., Ltd., an innovation instructor at the X-lab of Tsinghua University, and an innovation consultant of E-cube (Beijing) Technology Co., Ltd.

Li Huangye has more than 10 years of experience in TRIZ theoretical research and practical application. He has provided innovation theory training and consulting services to companies including Baosteel, Midea, Hisense, Xiamen Jianlin, etc. Li Huangye has been actively involved in adolescents innovation education since 2012. With the support of Shanghai College of Science of Technology, he has been offering an innovation curriculum at various schools in Shanghai. The curriculum was selected as the excellent innovation course of the Huangpu District.

(2) Ying Zhu

Shanghai HiFox Technology Co., Ltd

Biography:

In 2009, establish Topway(shanghai)Computer Software Co. LTD.. It's two products (professional training software in human resources and social work)gain the largest market share.

In 2005, establish Chuanghu(shanghai)Software Technology Co.LTD. , a company focusing on innovation and entrepreneurship education.

In 2017, become a member of the country's first enterprise mentor talent pool(with 10,000 members in total)approved by Ministry of Education

In 2017, coach Lanzhou University of Technology and Lanzhou Jiaotong

University to win the bid for 7 out of 15 golden projects , with 3 of them are nominated for national awards
2015-2016, complete 32 touring lectures of innovation and demo classes

Abstract:

Computer Aided Instruction (CAI) refers to teaching activities whereby computers are used to facilitate and improve instruction. After decades of development, it has achieved satisfactory results and gradually assumed more functions with the help of advanced mobile terminals and the Internet. In this context, in order to better respond to the national innovation strategy and push the application of innovative methods, the authors have made active and fruitful explorations on computer-aided innovation education. This article introduces a piece of computer-aided teaching software based on the book "TRIZ-Promoting Innovative Technology", and explores how CAI can be applied in innovation education as well as its advantages.

TRIZ competition in universities of China

By: Yongzhi Wu

Professor, Institute of science and technology information of Heilongjiang Province

Biography:

Initiated and organized the national TRIZ competition in Universities of China, and successively served as the director of the competition evaluation committee and the executive director of the organizing committee. He has directed and completed 15 provincial scientific research projects, published 3 books, published 15 papers and 7 patents, successively into more than 30 colleges and universities, 20 companies for innovative method training, lead the team to solve enterprise technical difficult problem of more than 500 items, put forward the technical scheme of more than 3000 items, creating, technical secrets, nearly 200 invention patents.

Abstract:

In 2010, the science and technology bureau of Heilongjiang province and other units held the university student innovation method competition, which aim at cultivating competitors' inventive ability by using TRIZ method and promoting its popularization in province.

In the past 8 years, the competition has expanded from one province to more than 20 provinces in China. There are more than 100 universities and more than 1000 entries in contest each year, which greatly push forward dissemination of TRIZ theory in Chinese universities.

Research and Education Based on TRIZ in Hunan University

By: Jiangnan Liu, Professor, Hunan University

Biography:

Jiangnan Liu is a Professor of Hunan University in China. She received her Master's degree from Wuhan University of Technology and Ph.D degree from Hunan University. Prior to joining Hunan University, Dr. Liu was a registered senior engineer and practiced machine design in Hunan Building Material Research and Design Institute Co., Ltd(1989-2000). She had a visiting position at University of California, San Diego, in 2006. Her current research interests include mechanical design theory & methodology, innovation theory & methodology, product design methods and variable topology mechanism. These researches have been widely published in scientific journals and conferences, and as industrial patents. Prof. Liu is a Fellow of Chinese Mechanical Engineering Society, and is currently serving as the reviewer of several international conferences and journals. She is recipients of a number of distinguished awards, including National Teaching Achievement Award from the Ministry of Education of the People's Republic of China(2009), Excellent Teacher Award from Baosteel Education Fund(2016), Teaching Master Award from Hunan University(2017), Excellent Paper Award in ICSI (6th International Conference on Systematic Innovation, 2015), as well as the Gold Medal Award in the 6th Global Competition on Systematic Innovation(2016).

Abstract:

The presentation will focus on TRIZ research, application and education in Hunan University. There is a team researching variable topology mechanism and mechanical product design methods based on TRIZ. This talk will introduce some of their projects accomplished based on innovation methodology, granted by National Science and Technology Project, National Natural Science Fund of China and Natural Science Fund of Hunan Province and some enterprises. With obtaining certificates of innovation method trainings, they have offered a series of courses about innovation to undergraduate and graduate. At this speech, the presenter will also show how to help students apply TRIZ to execute the innovation and entrepreneurship projects. Many students won awards in various competitions, published papers or obtained patents, as well as software copyrights. The strategy to promote and apply TRIZ in research and college education may be helpful to other TRIZ practitioners or professors.

Trend of TRIZ Application in Industries in the World

By: Isak Bukhman

TRIZ Master, Consultant of TRIZ Solutions LLC, President of Altshuller Institute for TRIZ Studies

isak-bukhman@comcast.net

Biography:

TRIZ Master, President and Consultant of TRIZ Solutions LLC (USA), President of Altshuller Institute for TRIZ Studies, honorary director of Chinese National Engineering Research Center for Technological Innovation Methods and Tools, innovation advisor of Tsinghua x-lab (School of Economics and Management, Tsinghua University), senior consultant of Chongqing Innovation Method Society, honorary member of Leibniz Institute of Interdisciplinary Studies (LIFIS).

As their chief methodologist, Isak spent almost ten years at Invention Machine Corporation (IMC-IHS) while the company established its global reputation. He now works as an independent consultant and is an owner of TRIZ Solutions, LLC. TRIZ Solutions LLC is a consulting company that offers the complete array of TRIZ Technology for Innovation products and services to companies from any industry by using a system of training, project facilitation, consultant preparation, and support in the creation of Centers of Innovation. TRIZ Solutions LLC helps to realize the privilege and obligation each member of our society has to be a creative person and to live a successful and happy life.

During recent years, Isak has been active delivering TRIZ training workshops and guiding the development of more than 100 innovation projects for more than 40 leading global Corporations, Institutes and Universities including: American Axle & Manufacturing (USA), BYD (P. R. of China), Bobcat (USA), Chery Automobile (P. R. of China), Delphi (USA), Eaton (USA), Hendrickson (USA), Ingersoll Rand (USA), Johnson Controls (USA), Alcon (USA), Biomerieux (USA), DePuyOrthopaedics (Germany), Medtronic (USA), Steris (USA), Baker Hughes (USA), Chemtura (USA), Masco-Behr (USA), Shell (USA, UK), Stress Engineering Services (USA), A.O. Smith (USA), BaoSteel (P. R. of China), Flowserve (USA), Hollingsworth (USA), Savannah River Site (USA), POSCO (South Korea), Xinetics (USA), DSO National Laboratories (Singapore), General Dynamics Land Systems (USA), Asus (Taiwan), Compal Electronics (Taiwan), Clorox (USA), Corning (USA), Epistar (Taiwan), GAF (USA), Henkel

(Germany), Huawei Technologies (P. R. of China), Intel (USA, Israel), Johnson & Johnson (USA, Brazil), Matter/Fisher-Price (USA), Microsoft (USA), NXP (Hong Kong), Samsung Electro-mechanics (South Korea), Philip Morris (USA), Philips (Netherlands), Shenzhen Kaifa Technology (P. R. of China), Whirlpool (USA), Siemens (Germany), GEGR-E (Germany), Southwest Research Institute (USA), Chung Hua University (Taiwan), Lunghwa University of Science and Technology (Taiwan), Mitsubishi Research Institute (Japan), Singapore Polytechnic-school of Mechanical & Engineering (Singapore), Tulane University (New Orleans, USA), Leibnitz Institute for Interdisciplinary studies (Germany), Holon Institute of Technology (Israel), Universidad Technologica Nacional (Argentina), Tsinghua University (P. R. of China), Hebei University of Technology (P. R. of China)

Isak's work has also included the delivery of numerous basic and advanced training seminars (some together with Genrich Altshuller), education and training of thousands of managers, engineers and researchers in TRIZ/Value Methodology, and – closest to his heart – seven years of child and adolescent creativity (TRIZ) education in his native Latvia. It was a long way from team of 12 year old students to a specialized TRIZ K11 elementary-middle-high school of Lomonosov name in Riga.

Abstract:

It is very difficult (maybe even not possible) to create a precise trend of TRIZ (TRIZ Technology for Innovation) application in industries around the World. We do not have an exact number of projects where TRIZ was used, we do not have information about these projects importance and how good they were created in hundreds of big and small industrial companies in the World. We do not have an access to details of these projects; it is very confident and secret information in most cases.

I prepared my presentation based on my personal experience of working with many leading and famous industrial companies. I also have used very valuable information received from many of my partners and colleagues around the World. In the presentation will be highlighted the following moments:

1. Which kinds of projects were successfully created by using TRIZ for different companies around the World.
2. Strategy and tendency of using TRIZ in industrial companies.
3. Integration TRIZ into different companies.
4. Positive and negative lessons we learned on the way of using TRIZ in different

companies

5.Recommendations for integration and using TRIZ for industrial companies.

I recommend a plan for TRIZ Implementation into industrial companies. It represents the first round of TRIZ implementation for a company. After first round completion, the company has internal TRIZ consultants and engineers prepared to use TRIZ for successful projects creation and problem solving. This step also prepares the company for continued TRIZ implementation using its own TRIZ specialists. The TRIZ Implementation Plan for companies varies depending on real conditions and requirements.

The TRIZ Implementation Process Contains the Following Steps:

- 1.TRIZ overview lecture for the company management team, including top R&D managers (about 4 hours)
- 2.Creation of a TRIZ Implementation Plan and approval by company's top management team
- 3.Review and selection of projects for further development (about 1 to 2 days)
- 4.Basic TRIZ training for project team members (5 days)
- 5.First workshop for all selected projects: project scenario creation for each project (about 1 to 2 days for each project)
- 6.Advanced TRIZ training for project team members (5 days)
- 7.Workshop sessions for all selected projects (5 to 10 days for each project)
- 8.Projects results review (1 day)
- 9.TRIZ Master class for selected team members and leaders, candidates for the company's TRIZ consultants/teacher (about 5 to 6 days)
- 10.Steps 3 through 8 are repeated 3 to 4 times with the candidates for the company's TRIZ consultants/teachers
- 11.Basic and Advanced TRIZ training topic preparation to the company, including case studies from the best projects results
- 12.Decision making about establishing the company's Center of Innovation.

TRIZ for industrial companies

By: Marat S Gafitulin

TRIZ Master, Business consultant
mgafitulin@gmail.com

Biography:

Business consultant, Master of TRIZ (Diploma No. 14), PhD pedagogical sciences, inventor

The main area of activity is the development and consulting in the sphere of innovations for industry and education.

2001-2003 - was the president of the International TRIZ Association.

Abstract:

Modern industrial companies have ambitious goals. Goals are a benchmark for development and at the same time a criterion for assessing the state of the company. For its successful development, industrial companies need to solve a variety of tasks: produce high-quality products; reduce the cost price; Reduce the number of defects, repairs, downtime; increase the share in the consumer market and other tasks. Based on the results of the analysis of the main market indicators, directions for improving production processes are determined.

Many companies realize that a dynamically changing world creates more and more problems. These problems require new approaches and innovative solutions. In the advanced industrial companies are trying to create and maintain an innovative atmosphere. Since innovations are born in the minds, special training courses are organized for company employees. The TRIZ course is one of the methods studied and used in practice aimed at the development of systems, including the improvement of production processes.

Specialists of companies - participants of TRIZ-training, come with their mini-projects. Each mini-project contains an actual production problem, requiring the search for its effective solution. Participants in the TRIZ training note the benefits of acquaintance and practical application of TRIZ. The contracting companies officially express their gratitude to TRIZ specialists for training specialists and implementing solutions received during the training.

The report includes the following items:

- 1.the main stages of interaction of companies with TRIZ specialist;

2. TRIZ-training process;
3. examples of solutions to production problems;
4. feedback from companies on the results of TRIZ training;
5. conclusions.

University Teacher's Guide to Conduct TRIZ Based Innovative Activity Learning for Students

By: Galina Terekhova

Associate Professor, South-Ural State Humanitarian Pedagogical University
terehovagv@cspu.ru

Biography:

Co-organizer of the international scientific and practical conference "Development of creative abilities in the TRIZ-based process of education and training" / Chelyabinsk (2005-2009).

The author of near 200 articles on TRIZ-based Education.

Abstract:

The article represents an analysis of educational process of students of Universities at development of innovative activity on the basis of the TRIZ (The Theory of Inventive Problem Solving).

We described the experience of mastering innovations at the theoretical level by introducing disciplines into the content of education, and also at the practical level providing the opportunity to participate in work with real problems, and skills creation of using received knowledge.

Our experiment on the introduction of innovative solutions in the process of teaching students made it possible to determine changes in content of the learning process and, and in the system of knowledge evaluation.

The developed exercises, the structure of consultations and accompanying material contribute to the formation of students' skills in solving real-practical problems in the educational process.

TRIZ applications in Hi-Tech High Volume Manufacturing

By: Anatoly Agulyansky

Ph.D, Sr. Staff Engineer in Intel Israel
anatoly@fluortech.biz

Biography:

Anatoly holds Ph.D. in Chemistry and collected long-term expertise working in the processing of materials for electronic applications and electronic components manufacturing. His experience is in both academic research (Chemistry Institute of Russian Academy of Sciences, Bordeaux University and Israel Institute of Technology – Technion) and Electronic components manufacturing (Private consultancy, Vishay Intertechnology, and Intel Corporation). Anatoly published more than 80 papers and a book. He is currently holding a position of Sr. Staff Engineer in Intel Israel.

Abstract:

Hi-Tech High Volume Manufacturing (HVM) starts up and ramps up after a technology development is completed. At this phase, main chronic problems are typically solved and all processes are integrated into production flow. It is considered that the technology should work properly and reliably. The only requirement from HVM engineers is sustaining, allowing to keep the process running. However, in real life, a number of problems occur both during and at the end of the process. These problems raised in a form of excursions and should be solved very fast and effectively. Hi-Tech manufacturing flow is typically very long because the material is processed through hundreds of operations, hence any delay in providing solution can result in a huge loss.

HVM problems must be solved fast; therefore, a special problem-solving flow is typically used. This flow is a strategy that consists of sequential steps for moving from problem definition to problem solution. The main challenge is that the flow does not explain how to complete each step. TRIZ concepts and tools are tightly integrated into HVM problem-solving flow and ensure a quick and effective solution. During the speech, the effective integrations and applications of TRIZ tools into this problem-solving framework within Hi-Tech HVM will be discussed in details.

Functional Design Based on Effect in TRIZ

By: Guozhong Cao

Professor, Hebei University of technology
caoguozhong@hebut.edu.cn

Biography:

Guozhong Cao is a Professor and vice-director in the National Engineering Research Center for Technological Innovation Method and Tool (2013-). He graduated in the School of Mechanical Engineering, Hebei University of technology, Ph.D (2007). Prof. Guozhong Cao is Secretary general of technical innovation methods professional committee of innovation methods research institute, secretary general of design theory and methods special committee of mechanical engineering institute, and secretary general of China TRIZ research institute. His research areas are TRIZ and its development, product innovation design, product service system construction, technology innovation failure control, etc.

Abstract:

Functional design is the core stage of product design. Functional design is the process of optimizing, adjusting and reconstructing incomplete functions, harmful functions and insufficient functions in the existing product functional system according to users' needs and product positioning, or planning and constructing the functional system of new products. According to the demand of products and technology innovation of manufacturing enterprises, a systematic product function design method is formed to support the technological and product innovation through the process of effect-driven function modeling, solving and evaluating, supplemented by the methods of patent knowledge mining, formal expression and qualitative simulation.

Mutual promotion of talent cultivation and economic benefits based on TRIZ in Guangdong province

By: Jie Yang

Associate Professor, Guangdong University of technology, China

Biography:

Jie Yang, Associate Professor, School of Electro-mechanical, Guangdong University of technology, China. His research interests include system innovation thinking and methodology, modern testing technology and instruments, intelligent electro-mechanical control, etc. He is mainly engaged in training and consulting of innovative methods, and has helped enterprises cultivate a large number of

Abstract:

In 2009, Guangdong province was approved by the ministry of science and technology as a pilot province for innovative methods. As the executive department, Guangdong productivity promotion center has carried out extensive and continuous TRIZ-based innovation method training and enterprise application pilot work, and the main strategy is the mutual promotion of talent cultivation and economic benefits. Now, gratifying phase results have been achieved. The R&D speed and effectiveness of the enterprise are improved, and it brings better economic benefits to the enterprise. In conclusion, the method has played a positive role and achieved remarkable results.

The application of innovation method in Tasly

By: Wei Zhang

Director of project management center, Tasly Holding Group, and Lecturer of Project Management College in Tasly

Biography:

IPMP C level, with more than 10 years of experience in project management, TPM management and lean management in tianshili, has rich experience in enterprise management.

Abstract:

TRIZ gives us the ability to find solutions based on logic and data rather than intuition or the knowledge of individual members when we encounter problems, which seems to give us a universal key to solving puzzles. However, the application of TRIZ in enterprises is a very systematic and long process, and there are a lot of uncertainties in the integration with the enterprise's own management model. Can the enterprise firmly apply and promote TRIZ in the environment of internal and external competition under increasing cost pressure? Is TRIZ needed to learn in every department and position in the enterprise? Can TRIZ improve the efficiency of enterprise management and create value? We will answer these questions through the practical experience of Tasly.

Discussion on the application of TRIZ in non-technical fields

By: Bing Han

Tianjin Innovation and Development Institute

Abstract:

TRIZ has originated from engineering, and several TRIZ developers started to expand application of TRIZ to non-technical fields in recent years. TRIZ reveals that problem solving patterns are universal across different domains. What really matters is a new way of breakthrough thinking proposed by TRIZ. In recent years, the research and application of TRIZ in non-technical fields have made great progress, which would be introduced, and how TRIZ can be applied in non-technical fields will be illustrated by case study. All these shows that TRIZ can be used to solve the problems in non-technical fields, and we should pay attention to the conversion of the situations.

Outline:

- Brief Introduction to TRIZ in non-technical fields
- The progress of TRIZ in non-technical fields
- Case Study: Solution to Reconstruction of Industrial Parks in the Central Urban Districts Based on ARIZ-85C
- Summary

Impact and scenarios of analogy in mechanical design

By: Lizhen Jia

Civil Aviation University of China, China

Biography:

Lizhen Jia, born in 1989, is currently working at Civil Aviation University of China, China. She received her PhD degree on Mechanical Engineering in Hebei University of Technology, China, in 2018. Her research interests include analogy-based design, innovative design.

Abstract:

Patent is a kind of technical document to protect intellectual property for individuals or enterprises. Patentable ideas generation is a crucial step for patent application. Analogy is confirmed to be an effective technique to inspire creative ideas. Followed by retrieval of appropriate analogs, mapping of design knowledge and target solution adaptation, analogy-based design usually starts from representation of analogy source. To diffuse one core idea into other new contexts and achieve more patentable ideas, this paper mainly centered on the first two stages of analogy-based design and proposed a patentable ideation framework. The analogical information of the source system, including source design problems and solution, was mined comprehensively through IPC analysis and represented in the form of function, behavior and structure. Three heuristics were suggested for searching the set of candidate target systems with similar design problem, where the source design could be transferred. Finally, the bladeless fan was selected as the source design to illustrate the application of this work. The design output shows that the representation and heuristics are beneficial, and is systematic ideation method can help the engineer or designer enhance creativity and discover more patentable opportunities.

The Major Research Areas Related To TRIZ In The NER-Center

By: Runhua Tan

Professor, Vice President of Hebei University of Technology and Chair of China TRIZ Association
rhtan@hebut.edu.cn

Biography:

Runhua Tan is a Professor and director in the National Engineering Research Center for Technological Innovation Method and Tool (2013-), vice-president of Hebei University of technology (1999 -). He graduated in the Department of Mechanical Engineering, Zhejiang University, Ph.D (1998). Prof. Runhua Tan is Editorial board member of Chinese Journal of Mechanical Engineering, Computer Integrated Manufacturing System, Chinese Journal of Engineering Design. He is a Chair of Chinese Society of TRIZ (2005-), Chair of Chinese Specific Society for Technological Innovation Method. His research areas are TRIZ and its development, design methodology, platform design, innovation management, etc. He won the Altshuller Medal, 2016, Altshuller Institute, USA.

Abstract:

In the past years we had many training classes of TRIZ for the engineers from industries. Many research projects, which are selected from the industries, have been carried out for the engineers. The interactive training processes show that there are many areas to be studied in order to assist engineers to identify innovative opportunities better. This study will introduce a few of them, such as disruptive and radical innovative processes, patent around design, platform evolution, extended AFD, innovative method for manufacturing process etc. The study will show some research results in this center.



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国家技术创新方法
与实施工具工程技术研究中心
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Technological Innovation Method and Tool