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The Background and History of SDPS: A Brief Glimpse of Its Past, Present, and Future

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Abstract Twenty-five years after the first conference of the Society for Design and Process Science, held in the emerging tech center of Austin Texas, its history remains a matter of lore, dwelling in the imagination of today's young volunteers and in the brief glimpses of members and participants, who only see fragments of the unique trail of events that led to this moment. Professional societies hold an important place in the history of science and engineering. They serve as the "watering holes" where professionals from the same discipline may gather and discuss the vagaries of their body of knowledge, while sharing important discoveries with their colleagues. In the traditions of SDPS, all disciplines are welcome—to not only share their work and research methods but also to join others in examining the very nature of knowledge itself and to seek ways to integrate it across disciplinary boundaries. With this brief history, we can only present a cursory tale of the incredible circumstances that led to what was once called, "The Society of the Future." We welcome readers of this, our 25th anniversary of the Journal of Integrated Design and Process Science. It was a long and almost unbelievable journey, but through it all, it would appear the Future has at last arrived.

Keywords: Knowledge integration, transdisciplinary, convergence, history, professional society

1. From the First SDPS Keynote Address

"*Many of you have recognized the feasibility that now is the time to start a new professional society to foster, to identify and to extend a core of science that deals with design and processes across a broad spectrum of human, technological and economic endeavours: a spectrum that covers the traditional disciplines of communications, computer sciences, economics, engineering, management, manufacturing, mathematics and statistics, and physical and social sciences and a cross-disciplinary science that can deal with rethinking, reshaping and restructuring a rapidly ever-changing world order*."

Dr. George Kozmetsky, First SDPS Board Chairman
1st World Conference on Integrated Design and Process Technology (IDPT)
December 7, 1995, IC2 Institute, Austin, Texas

2. Dedication: Professor. C. V. Ramamoorthy

We dedicate this special article of the Journal of Integrated Design and Process Science to Professor Chittoor V. Ramamoorthy. Dr. Ramamoorthy was a true pioneer of the discipline of software engineering, making important contributions, not only to software engineering but also to distributed and parallel computation and computer architecture. He held six earned degrees: including two graduate degrees from Harvard University, one in Applied Mathematics and a Ph.D. in Electrical Engineering and Computer

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Science. Dr. Ramamoorthy was a founding Board member of SDPS and was the guiding mentor for generations of SDPS members and contributors.

Figure. 1. Chittoor V. Ramamoorthy, Ph.D

3. Introduction

The pursuit of knowledge integration evolved with the modern science and engineering disciplines. It has taken many names over the decades: multidisciplinary, cross-disciplinary, interdisciplinary, meta-disciplinary, transdisciplinary, and convergence to name a few. The problem was not seeing the need, for that has been known almost from the early formation of the disciplines in the late 1800s, but attaining the goal. To date, with our best efforts, we have only achieved what could essentially be classified as empirical approaches to integration. Empirical approaches are no doubt useful and necessary, but a science of knowledge integration still awaits us in the future. That is the goal SDPS has set for itself and for over 25 years, we have pursued it with all the vigour of a new, yet very small, professional society. What follows is a brief overview of how the Society started and what it is all about, both now and in the future.

4. A Gathering of Minds

So many interesting and talented people were brought together over such a long time, it almost seems like fate had destined the formation of this new Society. All of them cannot be mentioned here, but the main characters in our drama begin with Professors Murat M. Tanik and Atila Ertas, both originating from Turkey and meeting in graduate school at Texas A&M. Dr. Ertas became Professor of Mechanical Engineering at Texas Tech University in Lubbock, Texas, and Dr. Tanik became Professor of Computer Science at Southern Methodist University (SMU) in Dallas. Dr. Tanik had previously worked directly for Mr. Arthur A. Collins for over a decade. Mr. Collins was a child prodigy who, at the age of 16, made the national news in 1925 by being the one person who could communicate with the MacMillan Arctic expedition, using only his homemade ham radio equipment from his home in Cedar Rapids, Iowa. He was a true genius and later founded Collins Radio in 1933, a leading technology company in the field of advanced communications systems. Collin's equipment was used extensively in the US Space Program and by almost all commercial airlines of the time.

Another important contributor was Professor Dr. Bernd Krämer, a professor from FernUniversität in Hagen, Germany, who was a pioneer in the emerging disciplines of computer science, software engineering, and online learning technology. He was also the founder and Editor-in-Chief of the

international open-access journal *e-learning and education*[1]. Dr. Krämer would later become an important leader within SDPS and has served on the SDPS Board for the last twelve years. Dr. Tanik and Dr. Krämer became friends when, in 1989, they both were visiting scholars at the Naval Post Graduate School (NPS) in Monterey, California. It is important to note that Dr. Richard Hamming was in residence at the NPS during this time. Dr. Hamming, the inventor of Hamming code, is a legendary mathematician whose work had important implications in computer engineering and telecommunications. He reviewed a draft of Dr. Tanik's new book on Software Engineering and remarked, "Why don't you cover information theory in your book?" Dr. Hamming's review provided invaluable insights which caused Dr. Tanik to redirect his research in new directions important to the future of process science.

Two other very important people involved in the formation of SDPS were Dr. Raymond T. Yeh, Professor at the University of Texas, Austin and Chair of Computer Science Department, and our dedicatee, Dr. C.V. Ramamoorthy, Professor at University of California at Berkeley. Both were pioneers in the field of software engineering in the early '70s. Dr. Yeh founded the journal, IEEE Transactions of Software Engineering, in the early 1970s and Dr. Ramamoorthy was founding Editor-in-Chief of the IEEE Transactions of Knowledge and Data Engineering. After leaving Arthur Collin's company, Dr. Tanik worked for International Software Systems Inc. (ISSI) in Austin, Texas—a Company founded and owned by Dr. Yeh. Finally, Dr. Steven Szygenda, Professor Emeritus at SMU, was an early supporter and advisor in the formation of SDPS. Dr. Szygenda's career reaches over five decades and involves every corner of interdisciplinary work including engineering, entrepreneurship, innovation, software and higher education. He held many important positions in both industry and academia.

5. Prelude to a New Society

In the years leading up to this preliminary period, a number of things occurred to help build the skills, interest, and momentum for what is called the" magic summer" of 1994. Dr. Ertas, Dr. Tanik, and Dr. Ibrahim Konuk had developed a series of special interdisciplinary conferences for the ASME Petroleum Division called Engineering Systems Design and Analysis (ESDA), first held in Istanbul in 1992. The second ESDA Conference was held in London, July 4-7, 1994; co-chaired by Dr. Ibrahim Esat of Brunel University in London.

Elsewhere, a special series of conferences called the International Conference on Systems Integration (ICSI) was founded by Dr. Peter Ng, Professor at New Jersey Institute of Technology (NJIT). The first two conferences were held at NJIT in New Jersey, but the third was held in Campinas, São Paulo, Brazil. Dr. Ng's close friend and colleague, Dr. Fuad Gattaz Sobrinho organized and chaired this event. All the while, Dr. Yeh and Dr. Ramamoorthy would participate in these events. It's important to note that Dr. Ng and Dr. Sobrinho were both Ph.D. students under Dr. Yeh, albeit at different times and different universities. Both went on to brilliant careers in systems integration, computer science and higher education. Dr. Sobrinho would go on to introduce novel and sweeping process-centered technologies throughout his home country of Brazil and beyond. Dr. Ng became a founding Editor-in-Chief for Journal and Systems Integration among many of his long list of international academic achievements.

Things were starting to stir, important connections were being made, and the time was ripe for new ideas and approaches. The idea of a new interdisciplinary society was in the wind and about to set sail. With these brief introductions and insights, let us begin with a most unlikely time and place where it all started, for who could have ever imagined it?

6. The Magic Summer of 1994

In the annals of SDPS, the summer of 1994 was magical because everything came together suddenly and unexpectedly at the Southern Methodist University in Dallas at a most unlikely location. On campus,

[1] https://eleed.campussource.de/

there is an unusual structure called Fondren Library, built in 1940. The library consists of two buildings connected by a ground-level walkway. The north building held the technical and engineering stacks, taking up the first two floors of this three-story structure. The third story, designed for the storage of books that were out of circulation, had no outside windows and no elevators. It was only accessible from a steep outside staircase, open to the weather, making it a difficult climb to reach the lone entrance at the top—a glass door that was the only source of natural light for the entire floor. In 1982, SMU had cleared this floor and built small offices and labs inside to house its nascent Computer Science & Engineering Department. In 1992, Dr. Murat Tanik joined the faculty as an associate professor, hired by department chairman Dr. David Yun, from MIT. The stage was set for the idea of a new interdisciplinary society. In 1994, in this small department, along its long narrow hallways, leading to its small windowless labs and offices, was the place for early discussions that led to the eventual formation of SDPS. Dr. Tanik's good friend and colleague, Dr. Atila Ertas, worked tirelessly during this summer and made several visits to SMU to meet and work with Dr. Tanik. Dr. Stephen Ekwaro-Osire, also from Texas Tech, helped with the formation of SDPS and later provided important leadership for the SDPS Journal. Dr. Ertas and Dr. Ekwaro-Osire remained leaders in the development of SDPS for many years. Dr. Ertas would go on to serve as Executive Director of SDPS for almost fourteen years.

The name of the new Society was still evolving that summer. As everyone had jobs and worked during the day, the late-night meetings at SMU continued. Dr. Murat Tanik and Stan Gatchel, a local engineering consultant who had met Dr. Tanik in the summer of 1992, discussed ideas about the new Society. On June 28, 1994, they had been working late at SMU. Dr. Tanik discussed what he called the "American Society for Design"; however, Mr. Gatchel suggested the use of "Scientific Design" to reflect the approach of using mathematics. Dr. Tanik then recalled a visit by Raymond Yeh on the previous day who suggested the word "process" be used. Dr. Tanik then suggested "Process Science" would be an appropriate term, so the early name for the society became the "Association of Process Science." The following week, Dr. Tanik left for London and planned to discuss the idea with colleagues, including Dr. Ibrahim Esat, Professor at Brunel University. The conference was ESDA. Dr. Ertas was leading the event and Dr. Ramamoorthy and Dr. Yeh were in attendance as well.

As the meetings and discussions continued during the Magic Summer of 1994, the first bylaws and goals were developed along with a new logo design. The word "Design" was added to the new Society's name in recognition of its importance as fundamental among all processes and first among the processes that create all human artifacts. The term, "Association," was replaced with "Society," indicating there would be a formal membership. As Nobel Laureate, Dr. Herbert A. Simon once pointed out:

"The proper study of mankind is the science of design, not only as the professional component of technical education but as a core discipline for every liberally educated person."

-- Herbert A. Simon,1999

Later that August, Dr. Tanik planned to attend a second conference, this time in Brazil. As mentioned previously, the conference was organized by his good friends and colleagues: Dr. Peter Ng and Dr. Fuad Sobrinho. The third International Conference on Systems Integration was held on August 15-19, 1994. Both Dr. Tanik and Dr. Krämer were invited to attend along with Dr. Yeh and Dr. Ramamoorthy. Before Dr. Tanik left on this trip, Mr. Gatchel had produced a one-page overview or "flyer" describing the new Society, based on the ideas from all involved. He had driven to the SMU campus the night before and slipped about 20 copies under the door of Dr. Tanik's small office. Dr. Tanik picked them up on the way to the airport the next day.

When Dr. Tanik's flight landed in São Paulo that Sunday there was a delay. The hotel bus sent to pick up the attendees was late arriving. While standing on the tarmac at the São Paulo airport, Dr. Tanik began a conversation with another attendee he had never met before—a fellow Texan named Dr. David Gibson. The conversation inevitably turned to the formation of this new Society and Dr. Tanik showed him the one-page flyer. In one of the most fortunate circumstances in the history of SDPS, Dr. Gibson turned out to be an Associate Director of IC2 Institute located in Austin. He liked the idea of this new Society and

invited Dr. Tanik to meet with Dr. George Kozmetsky, who was a famous entrepreneur, professor, and technology enthusiast. With all the activity during the Magic Summer, this event eclipsed them all and ended this formative three-month period that can never be forgotten (Figure 2).

Figure. 2. 1994: 3rd ICSI Conference, Brazil.
(Center left to right: Gibson, Tanik, and Krämer, Upper left: Dogru)

Dr. Kozmetsky was a most remarkable man. He earned his MBA from Harvard University in 1947 and joined the faculty as an instructor. He also began his work for a Doctorate of Commercial Science at Harvard. In 1950, he moved to Carnegie Institute of Technology in Pittsburgh (later named Carnegie Melon University) where he joined the faculty of the Graduate School of Industrial Administration. There, he became good friends with Herbert A. Simon. In 1952, he left the University to go to work for Hughes Aircraft Company in Los Angeles thus beginning his career in business. Three years later, he moved to Litton Industries and remained there for four years. During this time, he completed his doctorate degree from Harvard in 1957. He had finished the dissertation in 1950 before leaving Harvard but delayed his defense for seven years because he wanted the work to be perfect. He would later remark that it was a good lesson for the future.

In 1960, he left Litton to launch his own startup called Teledyne corporation. His partner was Henry E. Singleton, a fellow executive from Litton Industries. Dr. Kozmetsky took a big risk with Teledyne, he bet it all on this venture and could have lost everything. Fortunately, Teledyne quickly became a highly successful technology conglomerate in the 1960s. It should be noted that Dr. Claude Shannon, creator of communication theory at Bell Labs in New Jersey, sat on the Board of Teledyne Corporation. After six years in the high-flying business world, Dr. Kozmetsky was ready to return to academia. In 1966, he was appointed Dean of the University of Texas Graduate School of Business and moved to Austin, Texas. He held this position for 16 years and left the deanship in 1982. During this time, however, he had founded the Institute for Creative Capitalism (IC2) in 1977; what he termed a "Think and Do" tank. The name was later changed to "Innovation, Creativity, and Capital Institute." It was designed to explore the "broad economic, technological, and human factors that drive economic development in regions." Dr. Kozmetsky was fascinated with complex unstructured problems, those with no known solutions.

And so the stage was set for the big meeting about SDPS. After several postponements that fall, the meeting with Dr. Kozmetsky eventually took place in his office at IC2 headquarters on December 8, 1994. This meeting was important to the beginning of SDPS. Dr. Kozmetsky eventually agreed to serve as the first Board Chairman of SDPS. Little did Dr. Tanik know, but Dr.s Yeh and Ramamoorthy were also friends of Dr. Kozmetsky. At this point, the workings of the new Society began to take shape rapidly.

Dr. Kozmetsky reached out to many of his colleagues in both business and academia. Everyone began to plan the first conference and build the organization. In the fall of 1995, the Society was incorporated as a non-profit scientific organization in the State of Texas.

The first conference was held at IC2 headquarters in Austin, partially funded and organized by Kozmetsky's non-profit RGK Foundation. The three-day conference was the keystone event in launching SDPS. Dr. Ertas and Dr. Tanik worked very hard, in cooperation with IC2, to create this inaugural event and it was extremely successful. It was a small event (about 100 attendees) and one of them was UT Professor, Dr. Ilya Prigogine, winner of the 1977 Nobel Prize in Chemistry.

In those heady days, the World Wide Web (WWW) was just taking hold. New businesses and technologies were rapidly emerging. It is interesting to note what the concerns of that time were, e.g., the "Information Superhighway," where now it's "Cloud Computing." We can only imagine what the next 25 years will bring, but we are hopeful that a fundamental process science will be at the very core of science and engineering, yielding innovative technologies and creative solutions.

The following excerpts, taken from the first keynote address presented by Dr. Kozmetsky at The Award Dinner of this first conference, illuminate the ideas behind the future of our great professional society:

"SDPS is a new acronym for the 21st Century and beyond. Tonight is an appropriate time to ponder about The Society for Design and Process Science. Its First World Conference is a pioneering event. The conference brings together a number of distinguished scientists, engineers, managers from academia, government and business involved in the exploration and utilization of integrated design and process methodologies and techniques applicable to real-world problems. Some are involved in pushing the scientific frontiers to form a newer body of science and its practice for large-scale systems."

"The integration of interdisciplinary disciplines, theories and methodologies must embrace, as well as have the ability to account for, relevant cultural and social value factors."

"The methods of dissemination, cooperation and collaboration must include the utilization of ubiquitous computers and communication."

"The membership and organization must reflect almost every societal sector; namely, academia, business, labor, nonprofit and government."

And finally:

"I would hope SDPS becomes more than just a society to publish a first-class journal, hold excellent international conferences, and develop cutting-edge technical tutorial sessions. These are all necessary and important. I hope we take a critical lead to develop 21st Century classrooms, universities and polytechs. I would suggest that we are the ones that play an important role as a scientific and professional society to establish the global networks for the information and knowledge age."

And so it came to be: the first conference of a new Society that some were calling "The Society of the Future." The Society had set sail on a sea of hope and doubt, but with a resolute determination to discover what lay beyond the horizon. Many influential and brilliant people were on board and the unknown was their destination. The ideas and organization were now established and the journey would be long and difficult—for a speculative undertaking to find a new science that could integrate knowledge may take 100 years to realize, if it exists at all. Meanwhile, the traditions established by the disciplines continued their expansion and use in the design of civilization's artifacts. Floating in the wind was a new element that promised to be part of almost everything in the future. Its name? Computing! It quickly spawned a new concomitant discipline: Software Engineering. Who could foresee this discipline would become the largest in the world, eclipsing all others combined—but lurking deep inside these tiny complex systems was a little something called process.

7. 25 Years: The Future Unfolds

The second IDPT conference was held in Austin, but this time at a hotel, not far from IC2 headquarters where the first conference was held: The Austin Marriott at the Capitol, 701 E. 11th Street, Austin, Texas.

Dr. Kozmetsky had invited his friend and Nobel Laureate, Herbert A. Simon, to speak at this conference. Dr. Simon was a pioneer in many fields including economics, decision making, and computer science. He was also a pioneer in the new field of artificial intelligence. Dr. Simon was a keynote speaker again at our 5th-anniversary conference in Dallas in 2000. His words from that speech echo through today:

"Today, complexity is a word that is much in fashion. We have learned very well that many of the systems that we are trying to deal with in our contemporary science and engineering are very complex indeed. They are so complex that it is not obvious that the powerful tricks and procedures that served us for four centuries or more in the development of modern science and engineering will enable us to understand and deal with them. We are learning that we need a science of complex systems, and we are beginning to construct it."

There have been many notable speakers and participants who attended our conferences over the years including four Nobel laureates, one of the Apollo 14 astronauts who walked on the moon, famous scientists and engineers, numerous university presidents, and important corporate and government leaders from many countries. SDPS conferences are different. They give one the feeling of a family, but a family of devoted and talented engineers, scientists, teachers, students, and other professionals gathered to celebrate new ideas and initiatives. Everything is designed for participation. Being small in comparison to many larger Society events, the schedule allows time for informational meetings and discussions. SDPS events celebrate local cultures and people. We are an all-volunteer organization with highly devoted members that work very hard to plan and create one of these events somewhere in the world.

And so SDPS continues its forward march towards an integrative science. The methods obtained to date, primarily employ empirical methods; i.e, methods based on observation and experience. While they are beneficial as far as they go, they are not enough. In the parlance of mathematics, they are "necessary but not sufficient." The problem requires a new approach to integration based on first-principle science. Twenty-five years ago, our membership undertook a speculative search for such a science in their many labs and universities around the world. Along the way, they concurrently invented and expanded empirical forms as well.

We believe the fundamental concept of "process" can be an abstraction that holds the key to such a fundamental science. The concept has floated around philosophy since the days of the ancient Ionian philosopher of Ephesus, named Heraclitus [535-475 BCE]. In essence, he observed, "No man ever steps in the same river twice" and "everything flows." Through the centuries, this world-view has essentially been ignored, while science, followed by engineering, moved in a more mechanistic direction to create the artifacts and systems of the modern world that we see today.

8. The Long Journey to Form a New Professional Society

Professional societies generally center on the primary disciplines they promote and embody. The Royal Society, established in 1660 in London, was the first major professional society of science. As science advanced into strong disciplines, new technical societies were established, universities established separate disciplinary departments in the 1800s. There are now hundreds of societies around the world, but those built around the hard sciences are some of the largest. The Institute for Electrical and Electronics Engineering (IEEE), for example, is the largest, with over 400,000 members worldwide. Looking at their long history beginning in 1884, they had one great advantage before their formation: well-founded theories or "laws." They had Maxwell's laws refined and simplified by English mathematician: Oliver

Heavyside. These theories worked, giving engineers amazing predictive power in the design process. As time went on, many disciplines were spun from these same theories and some of the largest industries were created.

The main task of these societies was to build the society, i.e., the organization, the keeper of all knowledge for a discipline. SDPS is not so fortunate. It does not have an established science to build around. We must undertake speculative research to build the science which we term "Process Science" and we must also build the organization—a twin task that is much more difficult. Until the day a true fundamental process science emerges and is demonstrated dramatically to the academic community at large, our Society will continue to forge ahead towards its destiny. The dream of designing highly integrated systems to solve some of the immensely complex problems facing us in the future, requires nothing less. Someday, all roads will lead to knowledge integration (KI) and SDPS will be there, waiting at the crossroads.

9. Summary

SDPS was forged from a single idea: process. The fact that this concept is observed in so many different disciplines and that process philosophy has heralded its importance since antiquity, gave rise to the idea that there may be something very fundamental yet to be discovered

It appears the process concept could establish a broadly applicable abstraction on which to base the future of knowledge integration and dissemination at a formal level for a wide array of disciplines. The result could yield new science, new products, business innovation, and new solutions that address the complex problem sets of today and in the future.

Each year, SDPS sponsors an international conference that attracts hundreds of leaders in science and engineering. SDPS membership includes a diverse group of international experts across a broad expanse of scientific and engineering disciplines. SDPS conferences are unique in that they are designed to bring forth leading ideas that are transformative in character—ideas that may radically change our thinking.

Perhaps there is no better way to conclude this brief history of SDPS than with the words of Dr. Ibrahim Esat in his 2012 address to the Society:

"SDPS is a great and unique society established on the premises that the mechanistic era has lived its useful life and that we had to seek and search for ideas and concepts and constructs which will form the foundation of a new era. On that account SDPS is a society of great ideas, great vision, and great expectations. The science of tomorrow by definition is partly speculative and partly unknown. How can we rally ourselves and push forward when forward is synonymous with uncertainty – but that is what fuels the excitement, wonder, curiosity, and drive of SDPS membership. Uncertainty is the order of the day and more importantly the order of the future. We are proud members of the SDPS, those who thrive in uncertainty of complexity and know that the greatest findings surface precisely because emergence and complexity are the two faces of the same coin. We need new ideas but more importantly, we need a framework with which new ideas can emerge. Transdisciplinary thinking with transformative goals is such a framework; Transdisciplinary thinking is not a science, it is only the infrastructure that defines the process of thinking which seeks to unify a range of disciplinary constructs and logic. It is our guidelines without which the journey would not go beyond well-trodden footpaths. Our members are visionaries who embarked on this journey of discovery of the foundation of the new beginning. I wish you all an exciting journey."

--- Dr. Ibrahim Esat, 2012

Author Biographies

Stan Gatchel is currently the Senior Advisor for SDPS. He has previously served as both SDPS Secretary and Treasurer and had a small part in the early formation of the Society. He holds a B.S. degree in Aerospace Engineering from the University of Texas at Arlington and an M.S. degree in Engineering Mechanics from the Pennsylvania State University. His long engineering career spans many industries

and disciplines: vertical lift vehicles including helicopters and tiltrotor aircraft, power generation plants including fossil and nuclear, all types of transportation including automotive, rail, sea and air; diverse types of industrial equipment, software engineering—especially involving critical systems, computing services and communication technologies, engineering design and analysis applications, and more. He founded several small companies along the way and was an engineering consultant for many years.

Appendix

A. SDPS Bylaws

It was on one of the long flights during that magic summer of 1994. Dr. Tanik began to think about the Society and jot down some notes so as not to forget. He started with the fundamentals. As we are human we must begin with Ethics, that all-important part of classic philosophy that attempts to define the ideal behavior of an individual. But this is not enough. There is the practical matter of finding food and other essentials and doing it efficiently. Therefore, we must deal with Economy too. Finally, we must interact, not only amongst ourselves but also with everything around us. This is the idea of Environment in the most general sense, which includes ourselves. From these brief notes, the "3 E's" were born. Later that summer, a fourth "E" was added: Education, thus completing the foundation on which a new and innovative society could emerge. Here are excerpts from the first Bylaws of SDPS, drafted during that magic summer of 1994 and in their original formatting:

- ARTICLE II PURPOSE

The Society of Design and Process Science (SDPS) is dedicated to the study, understanding, and use of process science for the benefit of all people throughout the world. The society will act as a forum for ideas, a center of knowledge and an exchange for information by promoting the benefits of process science to all who seek to understand and apply it in accordance with the defining principles.

- ARTICLE III DEFINING PRINCIPLES

The society will be based on four "E's" as defining principles:

(1). Environment: Human-initiated processes must be designed and implemented to act in cooperation with the natural processes of the earth to produce a beneficial and sustainable environment for all inhabitants.

(2). Ethics: Processes must be based on the truth; propagating the virtues of understanding, charity, dignity, and fairness; while preventing the vices of deception and self-interest.

(3). Economy: Processes must seek to achieve a practical balance between the ultimate benefit of the processes and the resources required to realize it.

(4). Education: Processes must promote enlightenment and understanding within the human intellect as essential elements in developing cooperation and encouraging peace throughout humanity.

B. SDPS Logo

During the magic summer of 1994, Dr. Tanik had asked Mr. Gatchel to design a logo for the Society. He was experienced with a vector graphics program he had on his home Macintosh® computer. One evening in late July of that year, he opened a blank document and sat there staring at the screen. He wondered, "What should a process science logo look like?" During their many discussions that summer, he remembered Dr. Tanik defining the ethical principles that would go with this new science. He called them the three "E's," which were later placed in the bylaws that you can read in Appendix I above. Three "E's" — which seemed to suggest a triangle and there are none stronger than the equilateral triangle. So, a triangle was generated on the blank document and filled with a red color. There had to be more, but what? He then remembered some of the internal Technical Reports from Dr. Tanik's lab at SMU describing his research. He recalled the many discussions they had during the magic summer. Several reports showed star-shaped closed polygons representing n-queens solutions and a "noisy communication channel." With

this shape in mind, he found a tool in his graphics program that could produce such a figure and created one on the screen. This star tool had an option to set the number of points in the star. At first, he considered a five-point star, resembling the Texas star, but it would not fit inside the triangle. By playing around with this figure, he realized only a 12-point star would fit within the triangle and every fourth point was exactly perpendicular to one of the sides. This left a triangle with a wireframe polygon shape inside so he decided to fill the polygon, thinking it would be just a common solid-shaped figure. An amazing thing happened. By filling in the polygon with white, it filled only the closed areas of the polygon revealing a beautiful geometric figure — not a solid star, as he expected, but one with holes. Through these holes, the red of the triangle beneath is shown through making the beautiful pattern we all can see in the current logo. As it turns out, this star polygon figure would later be studied extensively and formally proved to have direct connections to magic squares and n-queens solutions, all building towards a fundamental process science. After adding the name around the triangle, this completed the logo which was then shown to Dr. Tanik who promptly forwarded it to Dr. Atila Ertas at Texas Tech. Dr. Ertas added the beautiful arc with the name placed inside. He also added a base plate with the Society's acronym shown in reverse type. An ampersand (&) was kept in the middle of the star thus completing the logo design that we now see.

Dr. Ertas had made some simplifications to the star to support the practical matter of making the logo more printable with the technology of this era. The logo was also used to create medal medallions and awards so the very small triangles at the center had to be changed for medal forging. By 2011, printing and medal pressing technologies had vastly improved, so the original design could now be supported. Mr. Gatchel undertook an effort to redesign the SDPS logo and return the true twelve point polygon as an important feature.

In the year 2000, SDPS formed an internal society called the Software Engineering Society (SES). Dr. Ertas had created the original logo for SES which was similar in shape as the SDPS logo but with only the SES acronym on the inside of the triangle. In 2011, this logo was also redesigned to include a version of Shannon's Communication Channel diagram inside the triangle which is another essential element in the road to process science. The green color was chosen for this logo. All of this work was guided by the SDPS Board of Directors with their full input along the way. The effort took about one year to complete.

Elements of the SDPS Logo

The Elements of the SDPS Logo have come to mean the following:

- Equilateral Triangle » The three original E's forming the Ethical base for the Society and for Process Science.
- Star Polygon » N-queens solutions and communication channel, essential elements in a fundamental process science.
- Ampersand (&) » The logic of the included middle—one of the main ideas behind a transdisciplinary philosophy, replacing Aristotle's binary Law of the Excluded Middle.
- ARC » A rainbow of the imagination with different levels of thinking, especially in transdisciplinary approaches. It has also come to represent the 4th "E" - Education, for without education the other E's are unattainable.
- Baseplate » A solid foundation for the Society, and for Process Science.

C. Principal Ideas & Definitions

What Is Process Science?

- The science of change, a concept that stems from the change-based world-view passed down from antiquity through process philosophy.

What Is Transdisciplinary?

- The characteristic of a discipline is to effectively integrate the knowledge from many disciplines. The SDPS approach to transdisciplinarity is through representational use of a common, fundamental abstraction called "process."

What Is Design?

- The process of continually adapting means to reach preferred, "satisficing" (i.e., "good enough") or optimal conditions. [Note: This broad definition borrows heavily from the definition proposed by Prof. Herbert A. Simon]

What Is SDPS?

- An international professional society for engineering and science devoted to the development and application of a fundamental process science. SDPS embraces the traditional functions of professional societies which include membership, scholarly publications, letters, official meetings, standards, record keeping, and conferences.
- SDPS Purpose: Knowledge Integration & Dissemination.
- Process is a fundamental concept which has not been sufficiently explored, scientifically. It could lead to important discoveries and innovations for the future while providing an approach to broad knowledge integration.

SDPS Primary Mission:

- To expand, advance and unify process science through education, research, development, exploration, and application of a fundamental or general process theory based upon a change-based world-view.

Four Primary Functions of SDPS:

- Recognition and Collaboration, Publication and Media, Education and Research, Design and Service

The Core of SDPS:

- Scientists and engineers explore all aspects and applications of fundamental abstractions, like processes, which form the very foundation of the sciences that engineers use to design the modern world. New discoveries here could result in dramatic changes to the future of science and engineering.

SDPS Tag line:

- Transformative Research and Education through Transdisciplinary Means

D. Commemorative Collection: History Document from SDPS 2015 Fort Worth

The history offered in this paper omits so many people, events, ideas and stories in favor of brevity. The beautiful tapestry called SDPS was woven over many years from a loom of very interesting people living all over the world, blending different cultures, disciplines, talents, and discoveries. They understood the vision of SDPS and worked diligently to make important contributions to this "Society of the Future."

It has always been difficult to document our history in more detail because the efforts of our volunteers are always directed at the more pressing matters of running a professional society. However, for our 20th Anniversary, celebrated at the SDPS 2015 Conference in Fort Worth, Texas, we created a special document entitled the *Commemorative Collection.* This 36-page full color document was prepared by a professional artist. It was our best effort to showcase the past and many of the people involed in forming and developing SDPS.

The editors felt it would be useful to offer this document on our SDPS website where interested readers can download copy. It has not been seen since those memorable days at the historic Fort Worth Hilton Hotel (formerly the Texas Hotel) when so many of our long-time members and supporters came together. While the document is seven years old, it still provides a benchmark in showcasing our history more fully. We hope you take time to look through it and get to know more about SDPS and its interesting past. Here is the link to a direct download of the PDF file (2.8 MB): https://sdpsnet.org/sdps2015commemorativehistory.