A Personal Historical Perspective on Systems Studies at Binghamton & Elsewhere

CoCo Seminar

March 2, 2016

Hal Lewis

Overview

- Reasons for knowing some history
- Subtext: A matter of identity
- Origins of systems studies
- Early days of systems studies at Binghamton: SAT
- My personal experiences leading me to systems science
- Systems science at Binghamton in the ‘80s
- Systems science in other locations
- What has happened since then?
- Personal reflections & possible lessons

Reasons for knowing some history

- To discover potentially useful ideas to pick up & develop anew
- To put our current ideas & activities into context
- To understand what's really going on now, we need to understand what went on before
- To avoid past mistakes
- To have a basis of communication with people from the past (alumni, past faculty, etc.)
- Pride/Marketing on past glories
- BUT NOT to attempt to recreate the past

Subtext: A matter of identity

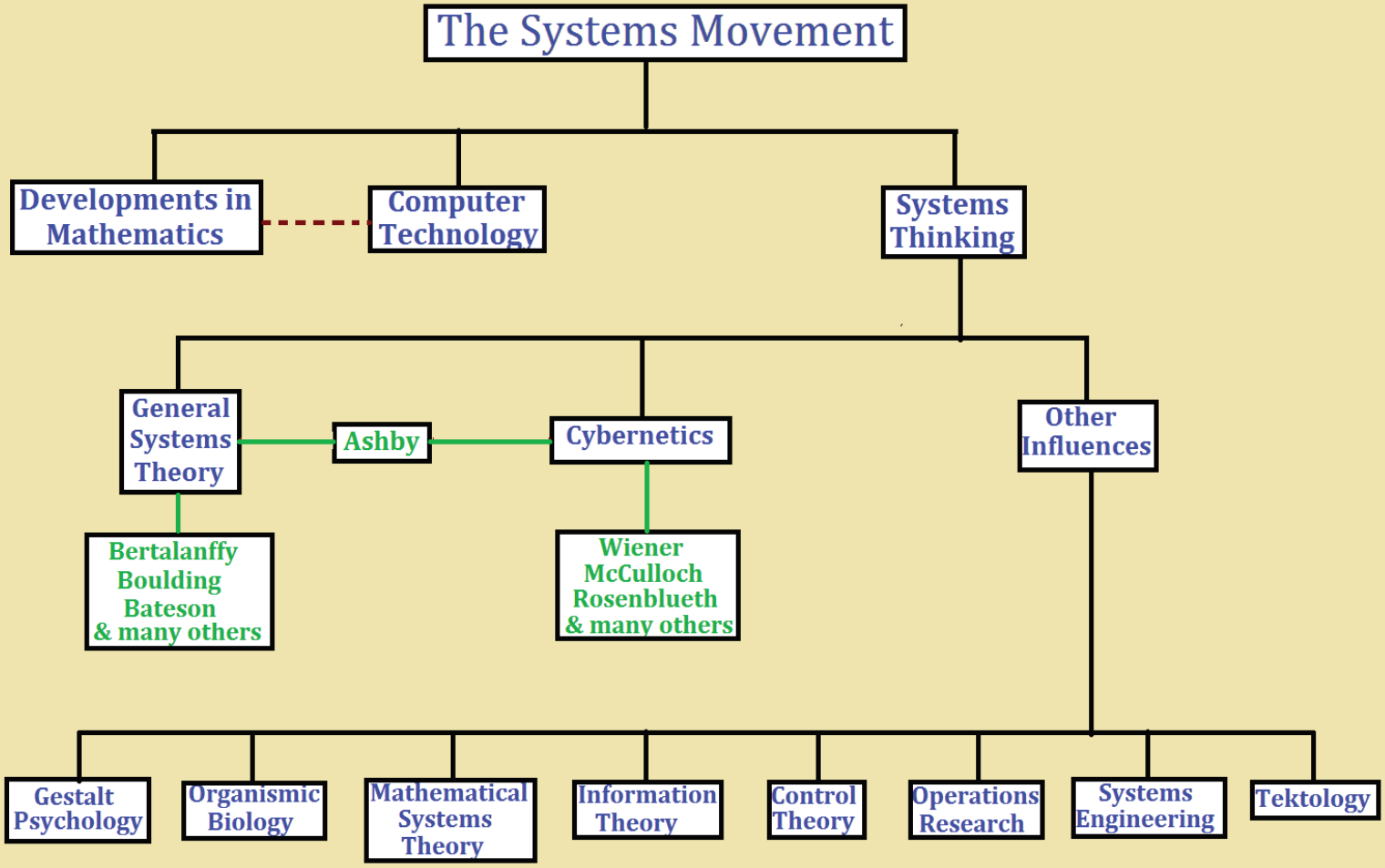
- I'll be upfront in telling you one of my subtexts—Identity issues are important
- I don't identify myself as an engineer
- I don't identify systems science as primarily an engineering field
- When we're misidentified by others or ourselves, we miss opportunities & we suffer

Subtext: Not that I'm anti-engineering

Subtext: Not that I’m anti-engineering

Subtext: But there is a lot more than engineering

Systems studies origins



Some definitions & claims of Klir

- **Interdisciplinary:** Fields on the border of (typically two) disciplines (biochemistry, social anthropology, geophysics, etc.)
- **Multidisciplinary:** Fields where it is useful to build teams of people from multiple fields to address the complex problems of a specific application area (sustainable communities, public health, robotics)
- **Transdisciplinary:** Fields of such a fundamental nature as to have major significance to all (or nearly all) other disciplines (systems science)
- Whereas most of science focuses on a “thinghood” domain, systems science focuses on “systemhood”

Systems studies origins

- From EMCSR website:

Looking back…Systems Theory and Ludwig von Bertalanffy

"Ludwig von Bertalanffy was an Austrian-born biologist and system theorist, who left behind a precious legacy: a new way of 'seeing' and thinking that he called General Systems Theory."

Copyright: Bertalanffy Center for the Study of Systems Science

Systems studies origins

- The Macy Conferences (1946 – 1953, Manhattan)
  - "They are also considered as the breeding ground for Cybernetics and breakthroughs in Systems Theory. In essence, they brought 'systems thinking' to the awareness of a cross-disciplinary group of intellectuals."*

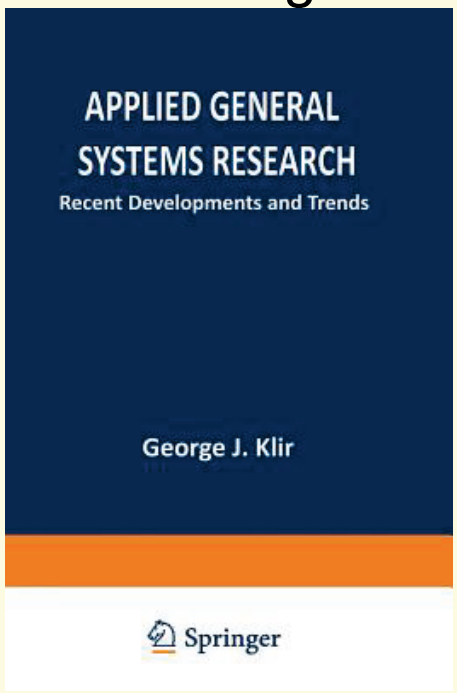
William Ross Ashby (psychiatrist), Gregory Bateson (anthropologist), Julian Bigelow (computer engineer), Heinz von Foerster (biophysicist), Lawrence K. Frank (social scientist), Ralph W. Gerard (neurophysiologist), Molly Harrower (pioneering clinical psychologist), Lawrence Kubie (psychatrist), Paul Lazarsfeld (sociologist), Kurt Lewin (psychologist, often regarded as the founder of social psychology), Warren McCulloch (psychatrist, neurophysiologist and cybernetician), Margaret Mead (cultural anthropologist), John von Neumann (mathematician), Walter Pitts (logician), Arturo Rosenblueth (physician, physiologist and a pioneer of cybernetics), Leonard J. Savage (mathematician), and Norbert Wiener (mathematician and founder of cybernetics) * From emcsr website

Systems studies origins

- EMCRS (European Meetings on Cybernetics and Systems Research, in Vienna since 1972, organized by the Austrian Society for Cybernetic Studies & the Society for General Systems Research) were founded by the pioneers of GST and cybernetics, and viewed as successors to the Macy Conferences
- George Klir (& other people from Binghamton) were heavily involved as organizers in the early years & had major following there

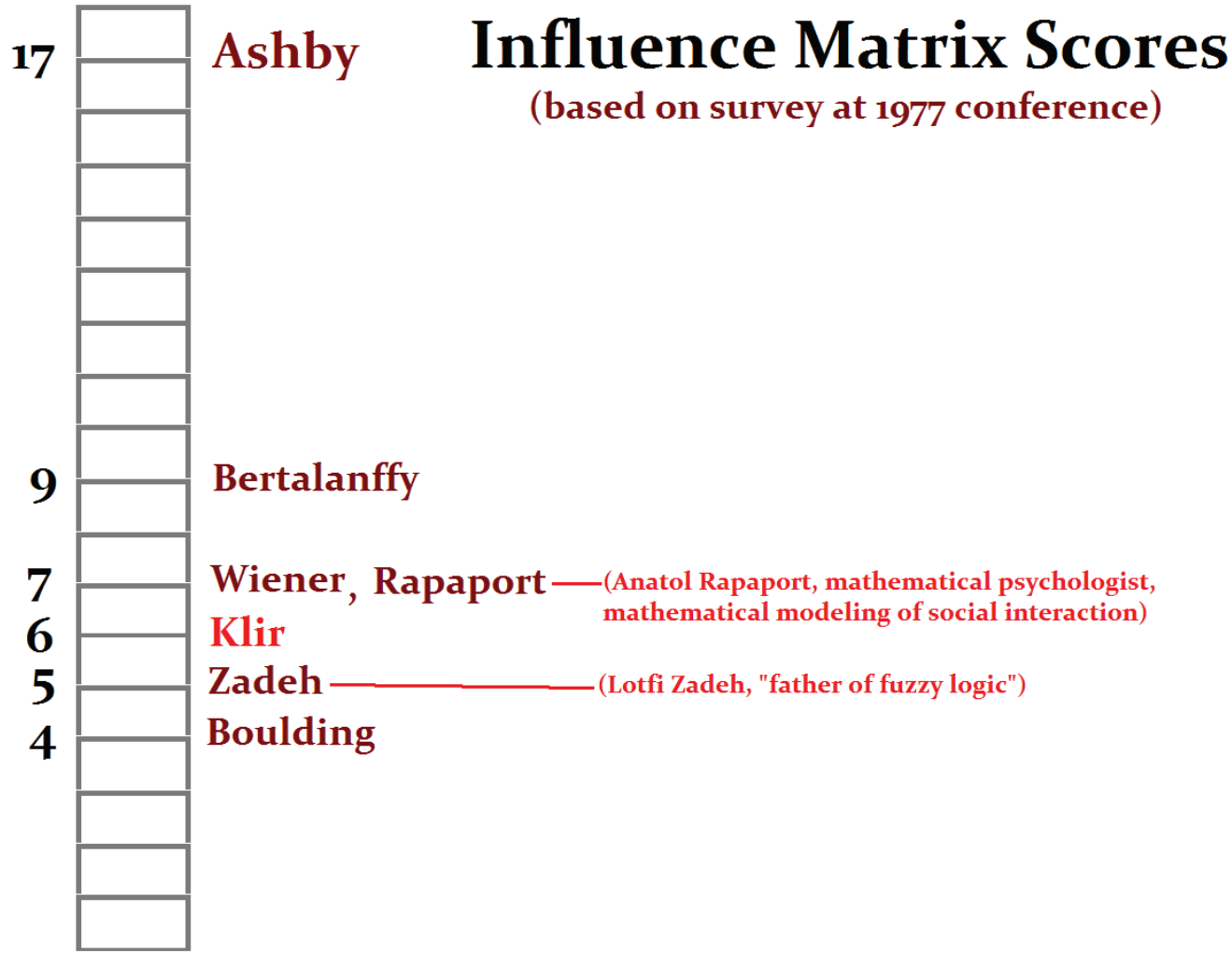
Systems studies origins

- SGSR (Society for General Systems Research)
  - Klir is president in 1981
  - (Margaret Mead was in 1972)
  - Major NATO-sponsored conference at Binghamton in August 1977

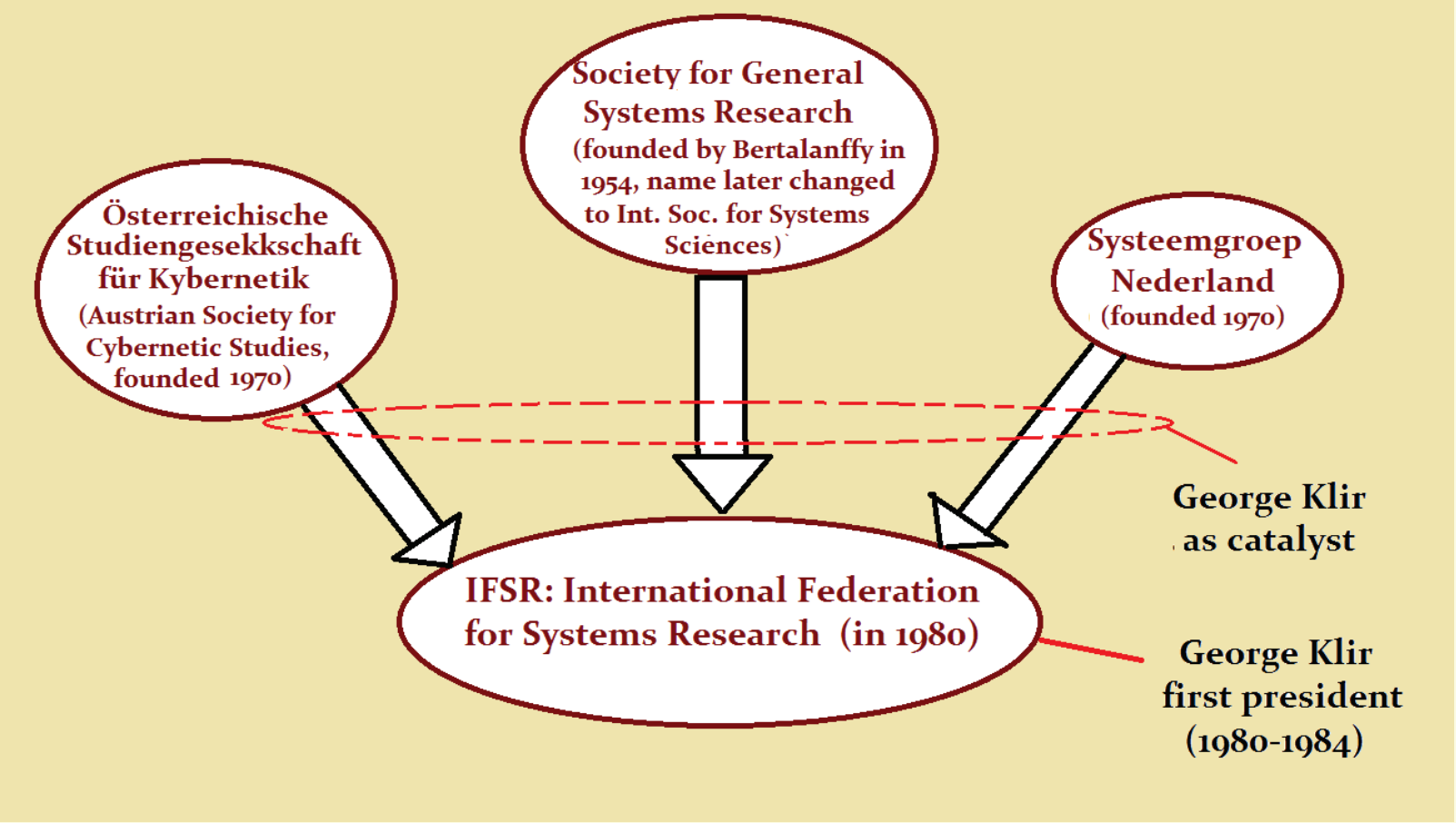


This volume consists of a selection of papers presented at the International Conference on Applied General Systems Research: Recent Developments and Trends which was held on the campus of the State University of New York at Binghamton in August 15-19, 1977, under the sponsorship of the Special Panel on Systems Science of the NATO Scientific Affairs Division. General systems research is a fairly new field which has been developing in the course of the last two or three decades. In my opinion, it can be best described as a movement which involves the study of all structural and context independent aspects of problem solving. As such, it is cross-disciplinary in nature and, in this sense, it might seem similar to mathematics. There is a considerable difference, however, between the two. While pure mathematics is basically oriented to the development of various axiomatic theories, regardless of whether or not they have any real world meaning, applied mathematics explores the applicability of some of these theories as potentially useful methodological tools in various problem areas. General systems research, in contrast with applied mathematics, is problem oriented rather than tool oriented. As such, it tries to develop genuine methods for solving systems problems, i. e., structural type and context in dependent problems. The term "genuine method" is used here to refer to a method which adjusts to the problem rather than requiring that the problem be adjusted to make the method applicable."

Systems studies origins



Systems studies origins



Early days of systems studies at Binghamton

- Think back to the mid-60s, Harpur *was* SUNY-B
- 1967: School of Advanced Technology started as 1st professional school at Binghamton
- Walter Lowen (Nuclear Engineering/Swiss Federal Institute-Zurich) hired as dean
- Walt's vision: To have a systems school (not an engineering school)—to bring in brilliant minds from diverse systems backgrounds
- Started with important connections to Systems Research Institute in Manhattan (&Geneva?) in terms of overlap in faculty, influence in content & format

Early days of systems studies at Binghamton

- 1967: 1st (evening) classes taught by adjuncts from IBM & GE, including Don Gause & Walt Niehoff, to about 100 graduate students (all part-time, about 80% employees of IBM, GE, Link, Corning, Bendix)
- 1968: SAT officially established, First regular faculty hired including Don Gause & Gerry Weinberg
- 1969: More regular faculty hired, including George Klir, Herb Hellerman (major player at SRI & in developing IBM 360 architecture & APL), Joe Cornacchio
- 1969-1972: First version of program becomes clearly established

Early days of systems studies at Binghamton

- SAT not yet departmentalized & only certified to offer graduate degrees in “Advanced Technology”, with 3 concentrations:
  - Applied mathematics
  - Computer systems
  - General systems
  - (Avoided using “science” as parts of names, because names containing “science” are not really science)
- Still determined to be a graduate-only program with MS and some PhD degrees
- Continue to be many adjuncts from local industry & joint appointments from Math Dept.

Early days of systems studies at Binghamton

- Walt Lowen & others firmly believed SAT should be open to students from all undergraduate backgrounds
- Foundations program (remedial courses for students from non-mathematical backgrounds) 6 (2 credit) courses on videotape:
  - Numerical analysis
  - Logic & Boolean algebra
  - PL/I
  - APL
  - Probability & statistics
  - Set Theory

Early days of systems studies at Binghamton

- Quotes from Walt Lowen:

". . . The administration, all products of the Liberal Arts tradition steeped in Literature, Art, and Social Science were perplexed. They were rightfully proud of the reputation earned by young Harpur College. Their main concern was how could they respond to all these technological pressures without destroying the Liberal Arts. . . .The only strategy that occurred to me was to sell the idea of creating an interdisciplinary, futures-oriented, graduate-only school, with broad programs built strongly on the foundations of the Liberal Arts. And they liked that idea and so I went to work. I hired a futurist, John McHale. I hired some outstanding people in computing and brought in a psychiatrist to deal with 'creative aspects of the unconscious,' and I hired George Klir. . . ."*

*George J. Klir & Walter Lowen (1991), "Department of Systems Science at the State University of New York at Binghamton", *Int. J. of General Systems* 19:1, 31-46.

Early days of systems studies at Binghamton

- Quotes from Walt Lowen:

"The school was founded on the principle that admissions to graduate studies in SAT required a bachelor degree from any field. There were those who fought that- they wanted students whose preparation was defined and predictable. But the systems science cluster was genuinely attracted to young minds trained in music, anthropology, biology, mathematics, literature, etc. etc. The role of the students should not be underestimated. This unique climate attracted exceptionally bright students, who needed elbow room and felt alienated by traditional discipline boundaries. There is no doubt that they trembled at the thought of studying mathematics and programming, but the faculty rose to the challenge. They devised courses which made it possible to learn in a supportive setting where backgrounds were disparate. As these students approached the end of their formal studies, a fascinating merging of disciplines occurred in all of them. Not only was mathematics and science no longer frightening, they discovered connections to their own disciplines. They, far more than we, the faculty, became the true systems thinkers.."*

*George J. Klir & Walter Lowen (1991), "Department of Systems Science at the State University of New York at Binghamton", *Int. J. of General Systems* 19:1, 31-46.

Early days: Some interesting people teaching in SAT

- John McHale (British artist/futurist/sociologist)
  - May have coined the term “pop art”
  - Worked with Buckminster Fuller
  - With wife, Magda Cordell McHale (also futurist & artist) lived in Binghamton 1968-77
  - Together they started Center for Integrative Studies as part of SAT
  - Completed his PhD in sociology while at Binghamton ?
  - Convened a major international conference of futurists (Including Toffler & ?Fuller) in Binghamton
  - Published best known books while at Binghamton

Early days: Some interesting people teaching in SAT

- Stefan Bauer-Mengelberg (mathematician/ conductor/lawyer)
  - Was once assistant conductor (under Leonard Bernstein) of NY Philharmonic
  - Was once president of Mannes College of Music
  - While a mathematician at SRI invented Ford-Columbia musical notation (a way to represent music in a computer)
  - Taught probability and statistics class, logic, Boolean algebra, etc. for SAT
  - Was highly effective in teaching mathematical topics at a high level to people with limited backgrounds
  - Partly because of his influence, SAT developed a strong link to Harry Lincoln in the Music Dept.

Early days: Some interesting people teaching in SAT

- Dieter Baumann, MD (Jungian psychiatrist)
  - Grandson of Carl Jung
  - Among first people hired by Walt Lowen
  - Taught courses from 6 weeks to a full semester at Binghamton
  - Brought a distinctively Jungian psychology-based influence to SAT as a basis of problem solving & cognitive modeling
  - Especially influential on Walt Lowen & Don Gause
  - (Don later taught a few summers at CG Jung Institute-Zurich)

Early days: Toward the mid-70s

- Plan to hire as a (bio-systems) trio from Buffalo: Robert Rosen, Howard Pattee, Narendra Goel, but Rosen backed out & went to Dalhousie instead
- Some intra-school strife: Weinberg starts HST (Human Sciences & Technology) & Hellerman starts SST
- Engineering (originally Professional) Bldg. designed 72-74, moved in in 76
- Some in Harpur still distinctly anti-SAT combined with NYS budget crises led to many financial & other challenges

Early days: Late-70s to Early-80s

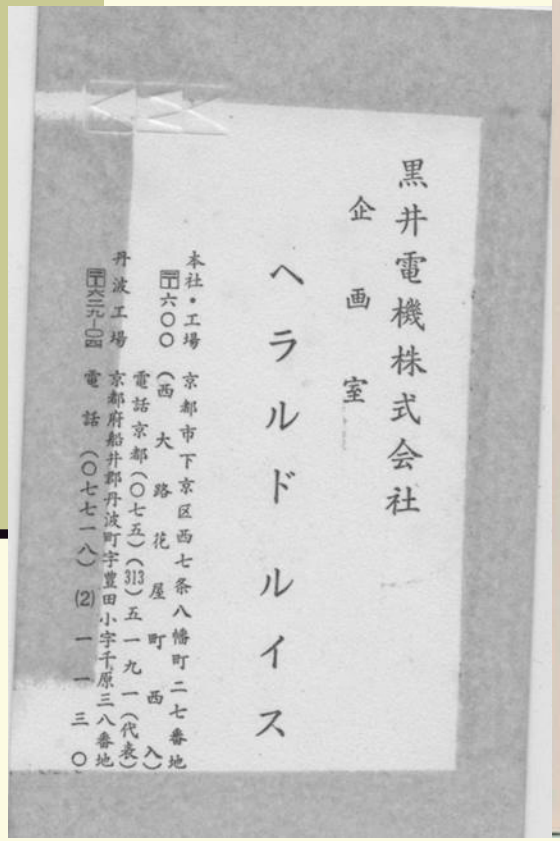
- School departmentalized (1976):
  - Computer systems concentration → CS Dept., Joe Cornacchio as chair
  - General systems + applied math → SS Dept. George Klir as chair
- Walt Lowen steps down as dean to teach in SS Dept.
- John Colligan becomes acting dean 1976?-1981
- Michael McGoff acting dean 1981-83
- Local industry/Cliff Clark's "High Tech Council" declare need for a "real" engineering school & put in motion process leading to Watson School

Personal Experiences leading me into systems science

- 1977-81: Had the most interesting job in the world at Kuroi Electric Co., Ltd. in Kyoto (with other plant in rural Tamba), a company of about 550 employees

Personal Experiences leading me into systems science

- A very special workplace: the 企画室



Amazing workplace: 企画室

- Small team (about 3% of the company) developing all sorts of products: pollution control, solar, wine, etc., etc.
- Incredible teamwork
- Opportunities to learn so many things: heat transfer, control systems, alternative energy market, marketing, economics, finance, creativity, μ–processors, etc.
- Two of my main roles: **calculations & syst. design**
- Brainstorming & creativity
- Hands on work: building prototypes, taking measurements, planting grapevines, making wine, etc. Even used Japanese typewriter
- Interpreter/tour guide
- Reading & summarizing business/technology literature
- Attending & summarizing lectures, conventions, etc.
- Market surveys/Sales calls

Personal Experiences leading me into systems science

- Systems sciencey take-aways from time at Kuroi Electric:
  - Calculations are a big deal

    Knowing in detail how to calculate something

    + Understanding why we calculate that way

    Truly understanding that object/process
  - Great teamwork makes it fun to go to work
  - Creative problem solving is a blast
  - Personally, I'm addicted to variety: prefer to be a generalist in applying analytical skills

Personal Experiences leading me into systems science

- Returned to US in late 1981—difficult readjustment
- Soon join IBM-Endicott, but struggle with overcoming boredom → Part-time graduate study becomes all the more attractive
- Accepted into MA in Economics Program & take micro-theory course with Ken Greene—did great & really loved it (found parallels to math)
- However, strictly practical considerations left me with concerns about continuing with that degree
- Met Jim Geer about that time when he was doing a short course for IBM & learned about Systems Science Program, soon decided to apply

Syst. Sci. at Binghamton in the ‘80s

- June 15, 1983:
  - SAT becomes the Watson School
  - Lyle Feisel assumes role of dean
  - Michael McGoff becomes associate dean
- Philosophy of the school becomes almost the antithesis of what it previously was: Feisel saw his mission as transforming this into a typical engineering (& CS) school
- A complex interaction evolves between Feisel & Klir

Syst. Sci. at Binghamton in the ‘80s

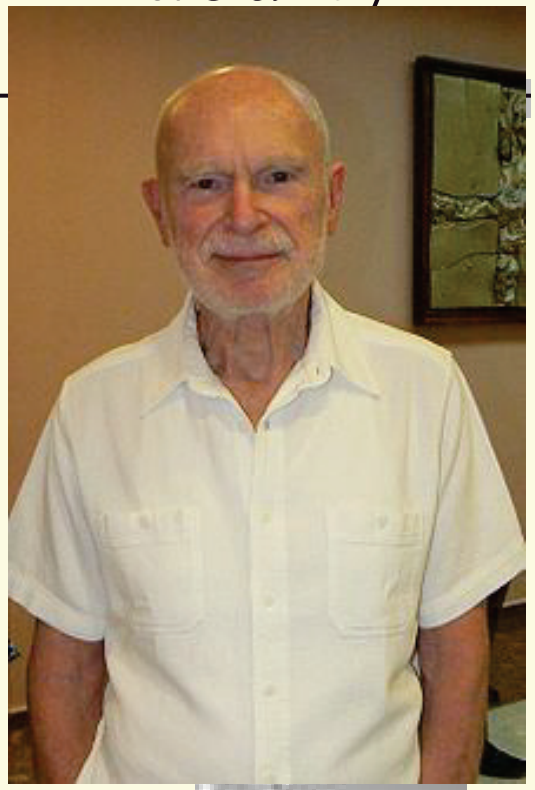
- Fairly large & stable student population drawn from 2 main sources:
  - Part-time, local students, mainly from industry (especially in MS Program)
  - Full-time students from around the world drawn by interest in novel program or specific professor (despite limited funding opportunities)
- Typically 6 or 7 full-time faculty members & a few adjuncts

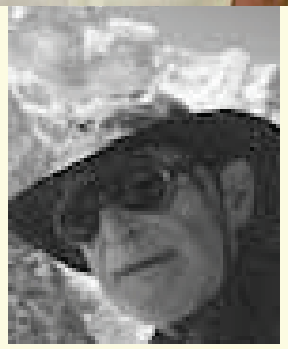
Syst. Sci. at Binghamton in the ‘80s

- Faculty research foci, curriculum content, & thesis topics generally eclectic, somewhat lacking in central focus
- Large percentage of evening classes
- There was some funding from grants & many international students had home country scholarships, but overall less emphasis on funding in those days
- Productivity in publications high but varied
- Strong tendency toward multidisciplinary connections especially with Harpur (most thesis & dissertation committees had at least one member from Harpur)
- Somewhat more interaction with CS Dept. than was true later

Syst. Sci. at Binghamton—Faculty

- **George Klir: Our systems science superstar**
  - Czechoslovak Academy of Sciences
  - Authored, coauthored, or edited approx. 50 books, many of which had truly major international significance
  - Major following internationally & appointed Distinguished Professor of Systems Science in 1984 when distinguished professors were rare





Syst. Sci. at Binghamton—Faculty

- **George Klir (cont.):**
  - Formative experiences early in his career recognizing “profound similarities” between systems problems in many disciplines led to decades-long quest to form his own approach to a general systems framework: GSPS
  - Deeply interested in philosophy of science & systems
  - Began placing major emphasis on fuzzy logic during 1980s shifting more toward nonadditive measure theory in the ‘90s
  - Pioneered mathematical field: Reconstructability Analysis
  - Pioneered second mathematical field: Generalized Information Theory (GIT)
  - His focus has often been more on fundamentals than on applications
  - Can we pick up some of his work and apply it?

Syst. Sci. at Binghamton—Faculty

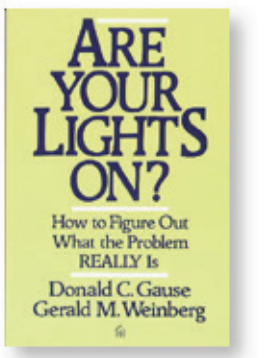
One of George's most significant systems insights (or at least my understanding of it):

Uncertainty can be a tool for dealing with complexity

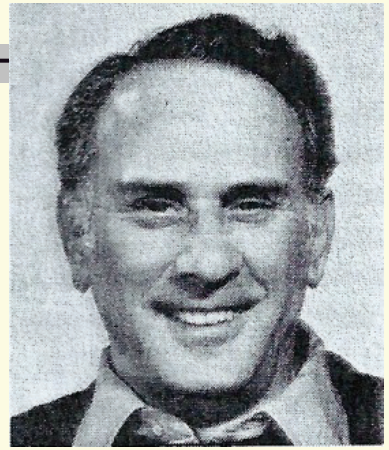
That is, uncertainty (in forms such as randomness or fuzziness) is not entirely a nuisance that we must suffer with, but can actually play a positive role

Syst. Sci. at Binghamton—Faculty

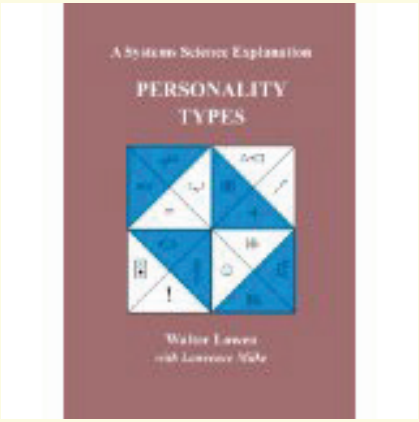
- **Don Gause:**
  - Michigan State University—Mathematics
  - One of the very first to teach for SAT
  - Prior experience in GM & IBM (including managerial experience in employee education)
  - Taught amazing course on creativity in problem solving
  - Also taught systems design, “requirements engineering”, adaptive programming



Syst. Sci. at Binghamton—Faculty

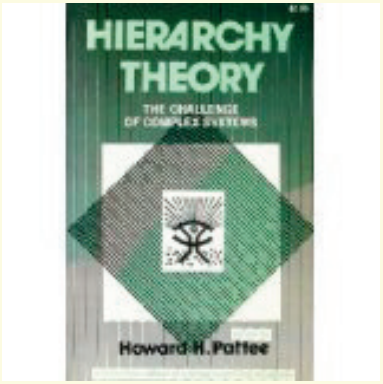


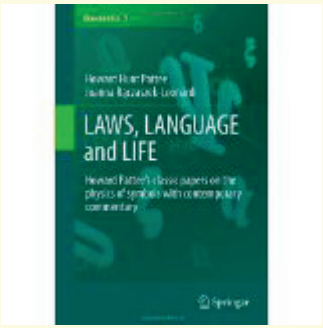
- **Walter Lowen:**
  - Swiss Federal Institute—Nuclear Engineering
  - Another very creative & innovative person
  - After stepping down as original dean, taught in SS Dept. & decided to shift his core research focus to connections of psychology to systems science—problem solving, modeling of cognition, & systems design
  - Courses taught: "Visual Thinking" & "The Psychology of Problem Solving"
  - Books: *Dichotomies of the Mind: A Systems Science Model of the Mind and Personality* & *Personality Types: A Systems Science Explanation*



Syst. Sci. at Binghamton—Faculty

- **Howard Pattee:**
  - Stanford—Physics
  - Our biological systems thinker, far ahead of his time
  - His current Wikipedia article lists his fields as theoretical biology/origins of life/complex systems/artificial life/ biosemiotics/biocybernetics/physics of codes/symbol systems
  - Had following in our Biology Dept.





Syst. Sci. at Binghamton—Faculty

- **Joe Flannigan:**
  - Univ. of Illinois, Urbana-Champaign, Mathematics
  - Also associate director of SRI-Manhattan & previously taught at Carnegie-Mellon
  - Time at Binghamton brief, but influence significant
  - Taught theoretical CS-type courses in a creative way
- **Jim Geer:**
  - NYU, Mathematical Physics
  - Best represented applied math concentration of SAT & eventually transferred to Mechanical Engineering Dept.
  - Interests centered on classical applied math—perturbation theory/fluid dynamics
  - Taught mathematical modeling & optimization

Syst. Sci. at Binghamton—Faculty

- **Narendra Goel:**
  - Univ. of Maryland, Mathematics
  - More of a bio-mathematician and general applied mathematician than a bio-systems person
  - Projects involved remote sensing & interest in protein folding
  - Taught courses such as Prob. & Stats., Stochastic Systems
  - Eventually left to teach at Wayne State
  - Good example of spirit of teaching math well to people w/o math backgrounds
  - I filled in for him in several sessions of the Prob. & Stats. Course when he was away on research

Syst. Sci. at Binghamton—Alumnus

- **Masahiko Higashi:**
  - Son of Kyoto artisans
  - Studied biology and mathematics at Kyoto University
  - Completed MS (1980) & PhD (1983) under George—with award-winning & highly mathematical dissertation
  - Played a prominent role in founding the Faculty of Science & Technology at Ryukoku University
  - Became Professor of Mathematical Ecology at Kyoto University 1994
  - Died tragically with colleague on research trip in 2000
  - "At the time of his death, he was considered the preeminent theoretical ecologist in Japan, having developed models of social Structure, sexual selection, and food webs, but his major contribution was a theory of the evolution of social behavior in termites."*

**Insectes Sociaux*

Syst. Sci. at Binghamton—Alumnus

Insectes soc. 47 (2000) 298
0020-1812/00/030298-01 $ 1.50+0.20/0

Insectes Sociaux

In memoriam Takuya Abe (1945 – 2000) and Masahiko Higashi (1954 – 2000)

D.E. Bignell[1] and T. Matsumoto[2]

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On 27 March 2000, Japan's leading termite ecologists, Professor Takuya Abe and Professor Masahiko Higashi, both prominent members of IUSSI, were killed in a boating accident while undertaking research on the invertebrate biogeography of islands off the western coast of Mexico. The tragedy, one of several to strike the Center for Ecological Research at Kyoto University in recent years, has devastated the Japanese social insect research community and saddened termite scientists everywhere. Both Abe-san and Higashi-san leave a widow and family, as well as an outstanding younger band of eager research students and research associates.

Takuya Abe, born 1 March 1945 in Osaka, was Professor of Animal Ecology at Kyoto University, where he had also been an undergraduate under Professor Masaaki Morishita, a distinguished myrmecologist and theoretical ecologist. From 1972 to 1975 Abe researched for his Ph. D. on the production ecology of termites in the tropical rain forest of Pasoh, West Malaysia. He was one of the first termite scientists to apply stratified quantitative sampling to tropical forest assemblages. In doing so he revealed the importance of subterranean soil-feeding forms in such ecosystems and set standards for the description of communities which became definitive models. He proposed a classification of termite life-types, making a fundamental distinction between "one-piece" and "separate-type" modes, which again established a precedent in the assessment of nesting types and the pattern of resource use. Subsequently, he performed and supervised numerous field-work campaigns in tropical SE Asia, the subtropical islands of southern Japan and further afield, focussed on termites but branching into an exciting mixture of disciplines ranging from cladistics to soil microbiology. He was notable for his self-effacing humour, often repeating the story of how as a young man he had been dismissed from laboratory work on account of clumsiness and told "he was only fit for ecology".

Masahiko Higashi, born 11 August 1954 in Kyoto, attended Kyoto University as an undergraduate where he studied both mathematics and biology. He then attended the State University of New York, U.S.A., where he obtained his Masters in 1980 and Doctorate in 1983, the next year receiving the Distinguished Dissertation Award in the Science, Mathematics and Engineering category. After postdoctoral work in the U.S.A. and Japan, he joined the Ryukoku University, Kyoto, in 1988 and Kyoto University in 1993, becoming Professor of Mathematical Ecology in 1994. At the time of his death, he was considered the premier theoretical ecologist

Takuya Abe

Masahiko Higashi

in Japan, having developed models of social structure, sexual selection and food webs, but his major contribution was a theory of the evolution of social behaviour in termites. This explained how selection could still favour sterile castes without the closer genetic relationship between workers and reproductives seen in the social Hymenoptera. Another notable achievement was demonstrating a theory of how conflict could arise and then be resolved between relatives in animal societies. Higashi hosted many international visitors in his laboratory and was a noted expert on the history and culture of Kyoto.

Together, Abe and Higashi proposed that nest stability and to a lesser extent the balancing of C and N inputs to the colony, were closely linked to the expression of social development in termites and to the evolution of a true (sterile) worker caste. This will probably be seen as their seminal and lasting contribution. Their teamwork also found expression in the encouragement of international collaboration. At the time of their deaths, joint fieldwork projects were in progress or planned with scientists in Thailand and Australia, and earlier collaborations in Kenya and Cameroon had led to the publication of ground-breaking work on mound-nest population dynamics and feeding ecology. Most notably, however, Abe and Higashi inspired and organized the preparation of a new definitive book on termite biology (*Termites: Evolution, Sociality, Symbiosis, Ecology.* Kluwer Academic Publishers) to supersede the two time-honoured, but now outdated, volumes of *Biology of Termites* (Academic Press), which first appeared in 1969. The new book will appear later this year and will serve as a lasting memorial to our two colleagues, sadly taken before their time, and in the prime of life.

Systems science in other locations

- Portland State Systems Science Program
  - Considered our sister program for a long time
  - Some cross-fertilization, but not much
  - Not an actual department & not part of any school
  - Small number (3-4) of core faculty with larger numbers of joint (5-7) & adjunct (5-7) faculty
  - Offer PhD, MS, two graduate certificate, & undergraduate minor programs
  - Previously “used” for “departmental” (as opposed to “core”) PhDs

Systems science in other locations

- Tokyo Institute of Technology
  - Probably largest (18-25 faculty) systems science department in the world
  - Site of a very interesting battle with sides led by Profs. Takahara & Sugeno
  - Change of focus & of name: Dept. of Systems Science → Dept. of Computational Intelligence & Systems Science
  - George (& I) have had significant long-term connections to both Takahara and Sugeno, but we've had no connections with the new generation

What has happened since then? ‘90s

- At the start of the ‘90s, Binghamton’s SS Dept. outlook was guardedly optimistic, judged small (just barely critical mass) but stable department
- The early ‘90s were a mix of opportunities & challenges:
  - Continued core of highly motivated full-time students from around the world & more of them funded (scholarships & research)
  - But local industry moving away & competition from maturing engineering graduate programs led to fewer part-time students
  - Faculty members were approaching retirement age at time when NYS budgets were tight
  - Faculty continue to have differing views on meaning of systems science & program was still somewhat weak in the sense of central focus
  - George was sick to death of being chair & no one willing to step up

What has happened since then? ‘90s

- At that time, Dept. of Mechanical & Industrial Engineering had two faculty members in industrial engineering field
- In 1994, those two break off from that department and merge with SS to form SSIE Dept., with one of the two as chair
- Why exactly that decision was made is an interesting question & the evidence is a little unclear:
  - It seems to have been an entirely top-down decision made by Lyle Feisel with absolutely no consultation with the faculty (at least the SS faculty)
  - However, there may have been an assumption that some change was inevitable
  - And there may have been some (e.g. Don) partly optimistic about potential synergy

What has happened since then? ‘90s

- For the 1st few years after the merger, separate rubrics (IE & SS) maintained for almost all the courses
- But by 1996, all courses listed with SSIE rubric Why?
- More of SS faculty retire
- 1st chair of merged department eventually claims no faculty member can be allowed to list title as __ professor of SS or ___ professor of IE
- Not yet an undergraduate program
- Degrees offered MS-SS, MS-IE, & PhD-SS
- PhD-SS “used” to offer equivalent of doctorate in IE under the Manufacturing Systems Concentration

What has happened since then? ‘90s

- By the time I got here in 1998
  - Original Sys. Sci. faculty who were still full-time pretty much down to just George Klir
  - George was totally sick of all things administrative or political
  - Idea had formed (championed mainly by Don Gause who was then a Bartle) to develop a Systems Engineering concentration under the Systems Science Programs
- So, upon arriving here, (though not tenured) I became almost immediately:
  - Coordinator for developing curriculum for SE concentration
  - Graduate director for systems science
  - Director of Center for Intelligent Systems
  - The only one actively championing systems science

What has happened since then?

- Center for Intelligent Systems (CIS) ORC
  - In some ways parallel to CoCo
  - Very multidisciplinary (geology, psychology, geography, philosophy, ME, EE, CS)
  - Many multidisciplinary proposals
  - Hosted about 10 seminars/semester—more than half by external speakers (including Glasersfeld)
  - Despite so many connections to Harpur, Watson dean's office was very territorial about it
  - I (with Dave Enke) worked very hard putting together an NSF-IGERT proposal centered around CIS, only to have the Watson dean refuse to sign on the day of the deadline

What has happened since then?

- PACCS Program in Philosophy, Computers, & Cognitive Science
  - Quite connected to Systems Science & CIS
  - Offered MAs & PhDs as concentration in philosophy
  - Strong connections to psychology & CS depts. as well as Systems Science
  - Eileen Way played a major role before moving over to systems science
  - A few of their students tried to move over to systems science PhD
  - I believed there was a benefit in emphasizing connections between cognitive sci. & systems sci.

What has happened since then? ‘00s

- IE Program changes name to ISE (Industrial & Systems Engineering), **should have** taken over SE
- BS-ISE degree starts, used as a justification for hiring only ISE faculty
- License eventually granted for PhD-ISE
- Distinctions blurred, but ISE programs grow rapidly
- Bioengineering Dept. starts, originally planning to have a systems science-like focus, Don Gause plays role in planning, I try to find ways to collaborate
- Systems Science degrees (both MS & PhD) “used” again while bioengineering waiting for degree license
- Practice begins of “using” systems science degrees for students from non-engineering backgrounds who want to study ISE
- Frequent confusion by students about distinctions in programs

Personal reflections & possible lessons

- There are other models of combined departments (e.g. Dept. of German & Russian Studies)

CARL GELDERLOOS

ASSISTANT PROFESSOR OF GERMAN

DONALD LOEWEN

ASSOCIATE PROFESSOR OF RUSSIAN

GERM 221: Intermediate German Conversation I

Marie Merdan

Informal instruction and practice in colloquial German. Primarily for students who have completed GERM 102 or 103. Discussion based on variety of cultural, commercial and some technical materials provides practice in more advanced conversational speech patterns and vocabulary. Prerequisite: GERM 102, 103 or equivalent. 2 cr. Course.

GERM 381C: German Culture 1871-1989

Neil Christian Pages

Course surveys major events, movements, themes and ideas in German cultural history from the founding of the first German nation state in 1871 to the fall of the Berlin Wall in 1989. GERM 381C equips students with skills in critical analysis of texts, formal writing and oral expression needed for more advanced work in German Studies. It is excellent preparation for study abroad in a German-speaking country. Taught in German. Prerequisites: Interest in German cultural history and a desire to learn more. Students should have completed GERM 305 or the equivalent.

RUSS 204: Intermediate Russian II

Nancy Tittler

Students finish learning the basic elements of Russian grmmar, expand their command of vocabulary and begin to read more extensive selections of Russian prose. Emphasizes conversation in practical, everyday situations. Aspects of Russian culture (film, music) incorporated through class sessions and student presentations.

RUSS 306: Advanced Reading and Composition II

Marina Zalesski

Continuation of RUSS 305 with similar emphasis on reading, writing and retelling skills. Additional focus on understanding Russian news media, including newspapers and broadcasts.

Personal reflections & possible lessons

- **Opinion:** Systems science, complex systems (or systems studies under any other name) is a transdisciplinary field that is much more than just engineering-lite or “technical”
- Maybe Portland State’s program has a better situation—not being a part of any school let alone a department
- But if we assume it is unavoidable for Binghamton’s program to be part of the engineering school & even part of an engineering department, can it still try to have its own identity?
- If two programs are merged into one department, there are multiple ways to do it, but what has evolved in the SSIE Dept. strikes me as absolutely **中途半端**

Personal reflections & possible lessons

- Perhaps in the face of organizational & other limitations of the SS Program, CoCo (or similar research center) might be the best way available to move systems studies ahead
- Try to avoid letting administrators get territorial about it
- **General lesson:** It is probably a mistake to let your program be used for purposes other than intended
- **General lesson:** Having a program where people "do their own thing" is good in some ways, but having some degree of consensus on a central focus for a program is good too
- **General lesson:** Academic people like to create new programs even at the expense of existing ones
- **General lesson:** We can't recreate the past & shouldn't try, but we should understand the past
- **General lesson:** Try to protect your identity/image