

# PI SUMMIT 2023

GUIDE & COMMEMORATIVE DIGEST

May 22-25, 2023

David L. Lawrence Convention Center  
Pittsburgh, PA



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Password: **PISUMMIT23**



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## Welcome

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## Meet Our Exhibitors

Special thanks to all of our Exhibitors, especially our **Diamond Level Exhibitors and President's Reception Sponsors**. Attend their talks and qualify for prizes!

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R Programming Workshop, Fireside Chat: Case Study Workshop, Mentoring Monday with Dr. J Mark Tuthill, Digital Pathology and Artificial Intelligence Workshop, PI Summit 2024

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# Dr. Ji Yeon Kim



*Physician Director, Esoteric Chem & Immunology,  
Special Coagulation, Lab Informatics  
Kaiser Permanente Southern California Regional  
Reference Laboratories*

On behalf of the Association for Pathology Informatics (API) and its Governing Council, welcome to Pathology Informatics Summit (PI Summit) 2023! We are now three years into a global pandemic that gave everyone a crash course on using laboratory tests to make critical decisions for school, work, travel, and everything in-between. In the meantime, the sheer amount of lab and pathology data, as well as audiences interested in it, has exponentially increased. The 21st Century Cures Act accelerated sharing of electronic health information in and outside managed networks, in addition to patients directly, while healthcare has been further digitized and distributed across virtual platforms and non-traditional consumer spaces.

What does this mean for pathology informatics? Imagine a data stream from each laboratory carrying gold nuggets and trash, feeding a river which goes into a lake, and ultimately, the ocean. These fuel personalized medical decisions and population health management, and the job of curating and tagging elements in these streams falls largely to the pathology informatician. However, those of us working in this space know that even routine tasks, such as the naming of test orders and results and flagging of “abnormal” findings, are not standardized between any two laboratories. So even though multiple streams now end up in the same data lake, they remain for the most part, like oil and water, immiscible. (All this for the electronically discrete, structured data - we still have faxes!)

Our 2023 PI Summit features an array of expert speakers, including Drs. Ila Singh and Alexis Carter who are leading key standardization efforts in our field. Dr. Singh is the founder of TRUU-Lab, a national U.S. initiative supported by the CDC to promote test names that are more easily understood so tests can be ordered more appropriately. Dr. Carter, author of numerous guidelines with the Association of Molecular Pathology, Clinical and Laboratory Standards Institute (CLSI), College of American Pathologists, among others, will be discussing the ground-breaking CLSI AUTO14 barcode standard that may eliminate the need to relabel samples sent between laboratories. In the arena of digital imaging, Dr. Darren Tranor, founder and director of the National Pathology Imaging Co-operative funded by the NHS, will be sharing details of his group’s efforts to deploy digital pathology broadly across all of the U.K. Dr. Gary Procop, current CEO of the American Board of Pathology, will provide a plenary session overview of the history and growth of pathology informatics as a subspecialty, and share his thoughts on current trends with active diplomates.

Please join us for these impactful sessions, along with many others, as we wrestle with old and new challenges in providing patient-centered and patient-facing care together. Meeting many of you at last year’s PI Summit felt like a warm family reunion, and we are so glad we are able to hold this gathering space in Pittsburgh for our community to meet again.

Thank you for the opportunity to serve you, and I look forward to connecting with you throughout the meeting!

# API IS PROUD TO HONOR:

## API'S 2023 LIFETIME ACHIEVEMENT AWARD

### Dr. George Birdsong



Dr. George Birdsong has led the transformative work in the past decade of moving cancer pathology reports from narrative records written individually, to structured synoptic reports that can be shared and aggregated for cancer registries, clinical trials, epidemiologic research, among other uses, within the U.S. and globally. Dr. Birdsong also played a pivotal role in bringing DICOM standards to pathology for whole slide imaging. He is the former chair of the Pathology Electronic Reporting (PERT) Committee and served as the CAP liaison to the International Collaboration on Cancer Reporting (ICCR). He has been involved also with SNOMED International, the Clinical Laboratory Improvement Advisory Committee (CLIA) of the Centers for Disease Control and Prevention, and has worked in numerous advisory groups and committees over the years. Dr. Birdsong was also a recipient of the CAP 2018 Lifetime Achievement Award. We are honored to recognize him with the 2023 Lifetime Achievement Award on behalf of the Association for Pathology Informatics, for his invaluable contributions to the field of pathology informatics.

## API'S 2023 DISTINGUISHED SERVICE AWARD

### Dr. J. Mark Tuthill

Dr. Mark Tuthill is currently Division Head of Pathology Informatics at Henry Ford Health System in Detroit and is a founding member of the Association for Pathology Informatics. He served as API President in 2005 and also served as Program Committee Chair for a number of years while managing API-related programming at other national pathology meetings such as the ASCP and USCAP. He has also been the Co-Conference Director/Co-Chair of the Pathology Informatics Summit Planning Committee since 2014. In addition, he has long served on the JPI Editorial Board and as a JPI reviewer. His contributions to the association, the meeting, and the journal are numerous and unparalleled. We are grateful for his ongoing involvement and participation in supporting the organization, and are pleased to recognize him with this Distinguished Service Award.



## PI SUMMIT 2023 EXHIBITORS

We gratefully acknowledge support from all of our exhibitors!  
Special thanks to our Diamond Exhibitors:



### SILVER



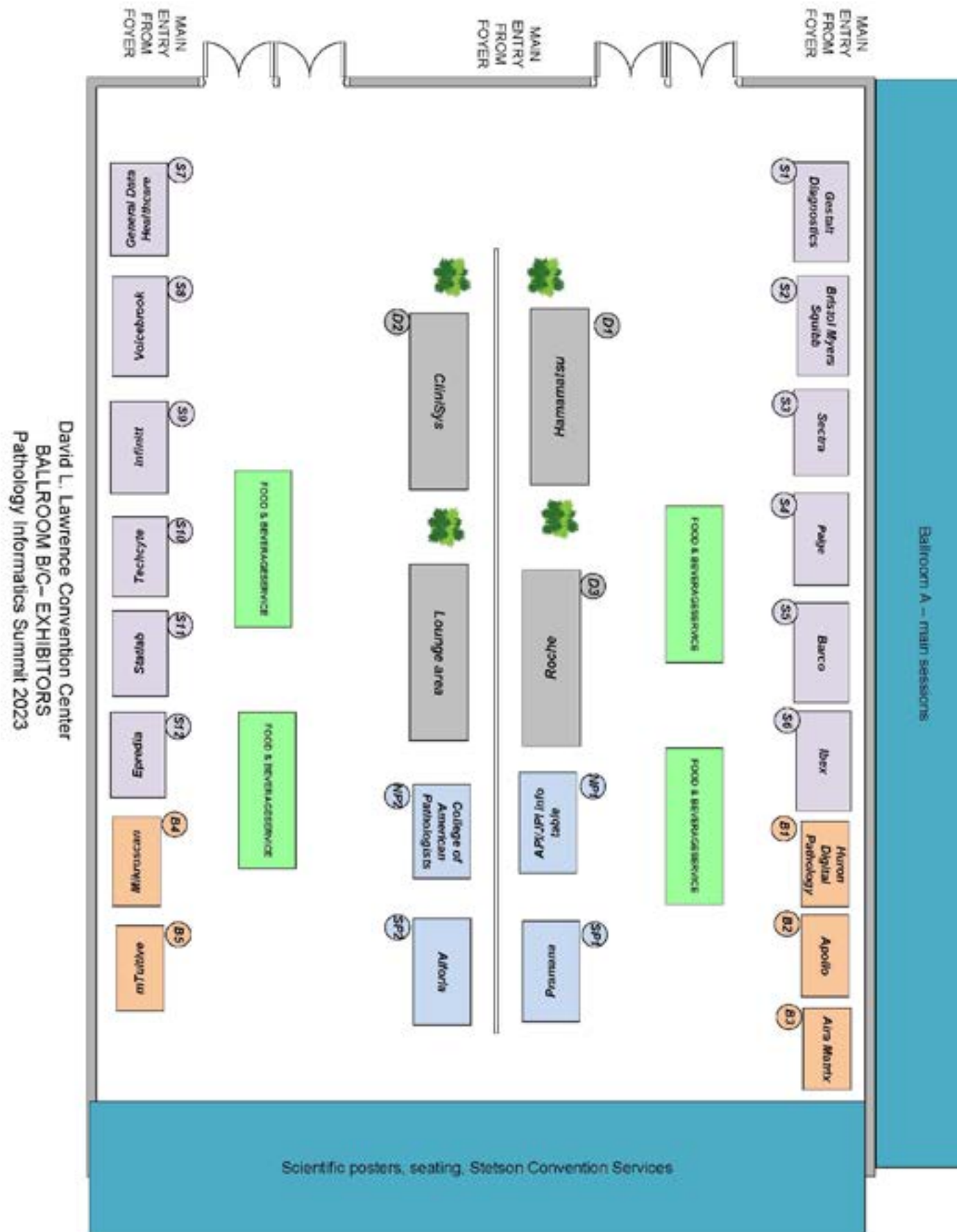
### BRONZE



### Not for Profit



# Exhibit Hall B/C Map



## Tuesday Exhibit Hall Hours

10:00 am - 7:30 pm

**Browse Exhibits/Posters**  
10:20 am - 11:20 am

**Lunch in Ballroom**  
12:00 pm - 1:00 pm

**Coffee/Tea Break, Browse Exhibits/Posters**  
2:15 pm - 2:40 pm

**Beer/Wine/Cocktail and Food Tasting with Vendor Trivia Game**  
5:30 pm - 7:30 pm

All vendors will be hosting beverage and food tasting stations and fielding attendee questions and supporting the **Vendor Trivia Game**.

## Wednesday Exhibit Hall Hours

8:00 am - 3:30 pm

**Browse Exhibits/Posters**  
10:20 am - 11:20 am

**Lunch in Ballroom**  
12:00 pm - 1:00 pm

**Coffee/Tea Break, Browse Exhibits/Posters**  
3:05 - 3:30 pm

**President's Reception**  
5:30 pm to 7:00 pm  
Gallery/Atrium

The exhibit hall will be closed, but vendors may be in attendance to field questions and socialize.

Full Dinner Buffet

Dell Technologies

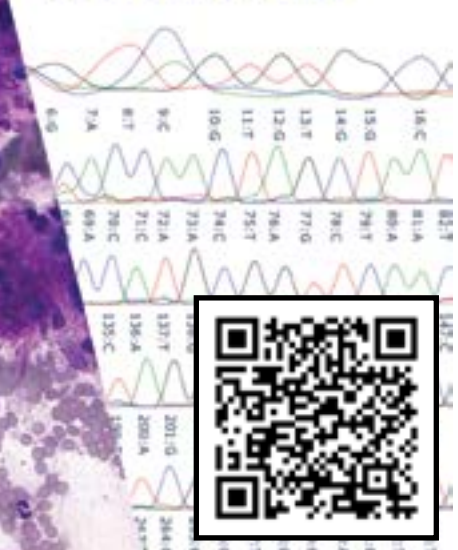
Your IT partner for  
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api  
 PATHOLOGY INFORMATICS

**Journal of Pathology Informatics**



ADVANTAGES OF DIGITAL



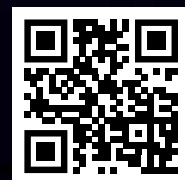
CONFIDENCE OF GLASS



Come see us at booth #D1

**HAMAMATSU**

PHOTON IS OUR BUSINESS



# Enabling healthier communities

As the world's leading laboratory information systems provider\*, Clinisys helps to make communities healthier and safer.

Clinisys enables over 3,000 labs in 34 countries to collect, analyze and report the data that informs billions of tests every year.

We help you improve patient outcomes and quality of life for citizens and communities.

**clinisys.com**

**clinisys**

Enabling healthier communities

\*Source: Signify Research



## Harness the power of digital.

Roche is proud to present

### navify® Digital Solutions

Roche Diagnostics unifies its digital health portfolio under the navify brand, providing a range of next generation software solutions.

### A portfolio of solutions built to enable digital transformation

**Medical Insights**  
Impact patient care & differentiate your offerings

**Operational Excellence**  
Improve your operational efficiency

**Digital Infrastructure**  
Integrate data streams across your different operations

### navify Portfolio Highlights

#### navify Digital Pathology\*



#### navify Analytics for Pathology Lab



#### navify Tumor Board



#### navify Oncology Hub



\*Research use only in the US. Not for use in diagnostic procedure

Stop by the Roche booth to learn more about the expanding portfolio of solutions for the pathology laboratory

#API2023

Roche

navify

# Diamond Exhibitor Speakers

Attendees are eligible to enter a raffle for a MacBook Air or Microsoft Surface

**TUESDAY, MAY 23**



4:00 pm

Dr. Anil Parwani, The Ohio State University

Hamamatsu Earns FDA Clearance for Primary Diagnoses: Unleashing the Power of Diagnostics - Key Insights from the Study

**HAMAMATSU**  
PHOTON IS OUR BUSINESS

4:30 pm

Chad Meyers, Vice President & Segment Line Manager

What's Next for Industry Standards?: An LIS Vendor's View on Areas to Progress Patient Care, Interoperability, Analytics and Machine Learning in Anatomic Pathology

**clinisys**



5:00 pm

Speaker, TBD

Digital Innovations for Better Patient Care: Improving Care Quality, Driving Efficiencies and Reducing Costs Across the Continuum

Roche



# "ASK ME ABOUT..."

**MEET  
API'S  
GENERAL  
COUNCIL**



"...MY LOVE OF TRAVEL."  
ENRIQUE TERRAZAS,  
MD, MS  
QUEST DIAGNOSTICS

TREASURER



"...MY PASSION FOR TRIVIA."  
TRIVIA WINNER PHOTO  
RONALD JACKUPS,  
MD, PHD  
WUSTL

T&E CO-CHAIR AND  
PRESIDENT-ELECT

"Long time Disney fan here. I am fortunate to have grown up in Southern California and go to Disneyland since I was a baby! I currently have a Disney annual pass (now called a Magic Key) and go almost every week. I am a good resource for first time Disneyland goers. :)"



"...DISNEYLAND!"  
JENNIFER WOO, MD  
CITY OF HOPE

MEMBERSHIP  
COMMITTEE CHAIR



"...THE STEELERS AND HOW THEY DID THIS YEAR! (OR MAYBE DON'T)."  
LIRON PANTANOWITZ,  
MBCCH  
UPMC

JPI CO-  
EDITOR-IN-CHIEF



"...WHY IT'S HELPFUL TO LEARN 3D MODELING, KEEPING HOUSE PLANTS ALIVE, EATING OUT IN L.A., OR MY CURRENT SCI-FI/FANTASY AUTHORS!"  
JI YEON KIM, MD  
KAISER PERMANENTE

API PRESIDENT

# "ASK ME ABOUT..."

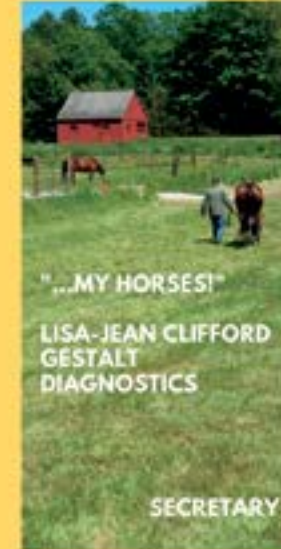
"...MY INTEREST IN MAKING AND EATING SOUP!"  
MICHELLE STOFFEL,  
MD, PHD  
MHEALTH FAIRVIEW

TRAINING &  
EDUCATION  
COMMITTEE  
CO-CHAIR



"...WHAT THE VIEW IS LIKE FROM THE TOP OF A 1750 FOOT COMMERCIAL BROADCAST TOWER."  
ULYSSES BALIS, MD  
MICHIGAN MEDICINE

PI SUMMIT  
CONFERENCE  
DIRECTOR



"...MY HORSES!"  
LISA-JEAN CLIFFORD  
GESTALT  
DIAGNOSTICS

SECRETARY

"Having owned and loved horses since the age of 3, I finally realized my dream of owning a horse farm in 2018. My passion is for rescuing OTTB's (Off the Track Thoroughbreds) and giving them a second lease on life with a forever home and skills where they excel and thrive - whether that is eventing, barrel racing or any combination thereof."



"...MY FAVORITE BREWS."  
STEVE HART, PHD  
MAYO CLINIC

TECHNICAL  
STANDARDS  
CO-CHAIR

"Sam Smith Organic Chocolate Stout  
Mango Cart  
or anything over 12% or the one closest to my mouth."

"...HOW I INSPIRE HALLOWEEN COSTUMES WHEREVER I WORK."  
DAVE MCCLINTOCK,  
MD  
MAYO CLINIC

PROGRAM  
COMMITTEE CHAIR



"...WHAT FACT I HAVE TO SHARE?"  
Amrom Obstfeld,  
MD, PhD  
Program  
Committee Chair-  
Elect  
Toby Cornish, MD,  
PhD  
Past-API President  
Mehrvash Haghghi, MD  
API PIER  
Committee Chair

Stephen Hewitt,  
MD, PhD  
Publications  
Committee Chair  
Anil Parwani, MD,  
PhD, MBA  
JPI Co-Editor-in-  
Chief  
Victor Brodsky,  
PhD  
Technical  
Standards Co-  
Chair

## PRESIDENT'S RECEPTION SPONSOR

### PRESENTERS Ballroom A, 4:10 pm - 4:40 pm

Enjoy these presentations and be on the lookout for 3 separate codes for a chance to win 1 of 2 Echo Shows!

AIFORIA



**Dr. Alireza Samiei**

Computational Pathologist

Wednesday, May 24, 2023  
4:10 pm, Ballroom A

"Aiforia Cloud: From Digital Pathology to Automated and Quantitative Image Analysis"

PRAMANA



**Prasanth Perugupalli**

Wednesday, May 24, 2023  
4:20 pm, Ballroom A

"Technology Advancements that Aid in Computational Pathology"

DELL



**Michael Valante**

Global Business Development Lead & Chief Technology Officer

Wednesday, May 24, 2023  
4:30 pm, Ballroom A

"Global Business Lead-Healthcare UDS & CTO-Digital Pathology"

## WOMEN'S NETWORKING EVENT SPONSORS

Pennsylvania West, Westin, 7:30 pm - 9:00 pm

Dr. M.E. (Doc) de Baca (2018 API President) and Karen Mudd  
Pride Foundation and the Association for Pathology Informatics



Pride  
Foundation

# API 2023 CALENDAR OF EVENTS



←  
SCAN HERE  
TO VISIT OUR  
WEBSITE!

## JUNE

THURSDAY,  
JUNE 1

### R Language Virtual Workshop –

Register by May 24!

Drs. Amrom Obstfeld, Joseph Rudolf,  
Patrick Mathias

Registration Open – Unlimited

### Mentoring Monday

Dr. J. Mark Tuthill (Henry Ford)

Free Registration

## JULY

MONDAY,  
JULY 10

### Fireside Chat: Case Study

Dr. David McClintock (Mayo Clinic)

Free Registration

## SEPTEMBER

MONDAY,  
SEPTEMBER 11

### Mentoring Monday

Dr. Jennifer Woo (City of Hope)

Free Registration

### DPAI: Tours and Sessions

Mayo Clinic, Rochester, MN

Registration Not Yet Open – Limited

THURSDAY - SATURDAY,  
SEPTEMBER 28 - 30

## OCTOBER

MONDAY,  
OCTOBER 9

### Fireside Chat: Navigating Projects and Publications

JPI Associate Editors Drs. Matthew Hanna,  
Hooman Rashidi, Joseph Rudolf

Free Registration

## NOVEMBER

MONDAY,  
NOVEMBER 13

### Mentoring Monday

Dr. S. Wesley Long (Houston Methodist)

Free Registration





Bob McGonnagle  
 CAP Today  
 Long-Term Ad Supporter of PI Summit

# HEADWATERS

The milestone of 40 years for the PI Summit stirs memories of its headwaters and very beginnings. Bruce Friedman's stalwart meeting in Ann Arbor...with a side trip or two to Miami and Las Vegas... like the Allegheny here in Pittsburgh, joined at the Monongahela with Mike Becich's visionary APIII in Pittsburgh... again with a side trip to Vancouver and Lake Tahoe... to form the mighty PI Summit (aka Ohio River) we're all at this May.

The summit is older than the API itself. But who could ever forget the great evenings of excited talk, computer games on the highest speed internet ever seen by many of us, electronic poster sessions, and lectures that have outlined the future of pathology informatics and even the specialty itself? And Bruce (gently) grilling the LIS executives? I'll never forget unending laughter; the candor, stimulation, and enduring friendships that also sprang from these events. How could anyone, I think to myself, not want to be a part of all this?

Certainly we know that many, many dozens of young pathologists have passed through, many now the leaders of the field... many have earned Informatics certification and come to chair and lead departments and other pathology organizations.

I cannot forget Mike introducing us all to the future of digital pathology, the critical life of lab data, the endless horizon of research, and many more concepts that today form the lingua franca of pathology itself.

And genuine partnerships with vendors were hatched here, in a beginning that was rare... and still too rare...in the broader field. The dialogue has for over 40 years entertained and informed. PI Summit remains the best launching pad and space for trial balloons, and free inquiry.

It's been a joy to witness and share, and here in this brief item to express my gratitude to all involved.



Scan here for archival materials, such as those generously donated by Dr. Ray Aller relating to the field of pathology informatics

WebPath created by Edward C. Klatt MD, starting in the Department of Pathology at the University of Utah and continuing to the present at Mercer University School of Medicine at Savannah. Source: <https://webpath.med.utah.edu/GUIDE/INTRO.html>

# CELIDH

Dr. Edward Klatt  
 Mercer University; Long-Term Travel Award Sponsor

API developed from a cadre of creative, enterprising individuals who often became involved in fledging pathology informatics through personal computing. We learned efficiency through programming limitations of a few kilobytes of memory (my web pages still average 1k). My original IBM-PC, which I last booted 01/01/2000, showed a date of 03/04/1984.Y2K and other myths come and go. My 1994 MacG4 employed to create an educational web site still in existence, does boot, but is out in the garage. One of the first personal computers was co-developed by Ed Roberts, in the very first class of Mercer University School of Medicine. The skills and interests developed from personal computing translated to expertise in laboratory applications. My team replaced a paper system with a fledgling LIS in the early 1980's. A laboratory director across town, limited to purchasing equipment referenced to existing equipment, built an early LIS around a single Apple IIc. We used computer operations as a means to leverage changes in pre- and post-analytic processing, not just analytic workflow, while the workforce retrained to do more faster, and those trends have continued since.

In 1984 my laboratory had one of the first artificial intelligence (AI) applications: the Yellow IRIS (doi: 10.1093/ajcp/86.5.661) which imaged and classified urine sediment components. My early voice dictation system (doi: 10.1016/0010-4825(91)90044-a) costing thousands of dollars was replaced only a short time later by a better program for under \$100. Computing defied historical market trends with declining costs despite exponential growth in functionality driving further advances in applications. At another workplace

in the 1990's, one of my colleagues championed use of Pap smear screening / rescreening by AI, demonstrating improved throughput without missing abnormal cells while technologists devoted time and expertise to actual diagnosis. Then as now, pushback comes from those who fear loss of human control, but for processes humans don't do consistently well...are you looking away from this page at a monitor or mobile device right now?



The photo to the left is from last year's HIMSS conference where I was a speaker and moderator. The kilt is a highland dance tartan. The word celidh in gaelic refers not only to a dance, but also a gathering and celebration, which is what occurs at the PI Summit. The scarf tartan represents a memorial to a single person. Princess Diana is remembered as someone who cared for others, making everyone she met feel special and valued with her genuine warmth and compassion. The tartan is inspired by the Royal Stewart plaid honoring people empowered to change the world for the better.

# THE VIEW FROM HERE

J. Mark Tuthill, MD

World's First Virtual Informatics Fellow  
and PI Summit Conference Co-Director



Did you realize that forty years ago the term pathology informatics had only just been coined by Dr. Bruce Friedman in a seminal paper? Physicians had no idea what the word meant. Frankly, I think it just might be starting to catch on, although there is a lot of confusion about what “informatics” really is. Sometime after, there was a debate about what to call ourselves. Many referred to themselves as “informaticians;” others as “informaticists;” and a rare bird (you know the species) as “informatadors”. Now, both informaticist and informatician are caught and fixed in spell check. Sorry informatadors. Ray Aller, as I recall, sealed the deal for the Association of Pathology Informatics when he suggested that “informatician” sounded too close to “mortician” to be palatable. Although, many an informaticist started their career on the autopsy service.

Initial application of computer-based imaging technology to pathology focused on photodocumentation and case projection.

There was some early use for quantitative image analysis. This process was referred to as “digital imaging.” It would take time for the more broadly inclusive and special specific term “digital pathology” to come into common parlance. One prototype concept for a device referred to as a “virtual microscope” was sketched out on a cocktail napkin in the bar in the Pittsburgh Marriott. The napkin was lost, but the idea evolved iteratively. Rapidly, this became what we now call the whole slide imager (WSI) or a slide



*continued*

scanner. There were many people involved who had different approaches to solve the problem of scanning glass. What's next? Remove the glass slide and image the tissue directly? It's happening!

From today's perspective it is hard to understand the implications of 32 MB hard drives, limitations of 8 MB of RAM, and 9600 baud modems. Much telepathology was conducted on “high resolution” monitors of 640 by 480 pixels. Oh, and did I mention? Price tags were \$5,000. A typical telepathology system could cost up to \$ 15, 000 having less power than an iPad.

How fast it all changed. The AIMCL meeting in Ann Arbor run by Dr. Friedman and the APIII meeting in Pittsburgh run by Dr. Becich were technologic showcases and marvels of engineering, ushering in a new age. Including the day when an awfully expensive piece of fiber optic cable was installed in the Pittsburgh Marriott by a Telcom company specifically for the meeting. You'll have to ask Dr. Becich the details of how he finagled that. In those days, we ran a large array networked desktop computer that were used for the then new “electronic posters.” The workstations were all networked using that fiber as a

central core.

Night came. The audience left for the day, but the residents and fellows knew what to do! Game! A riotous game of networked “Doom” at high speed ensued. Runners would go out to procure additional libations and food, return, and distribute to the players. Whether you were a gamer or not, it was fun, and it was a mind-blowing example of where we were heading. This happened more than one year. I always wondered what Dr. Becich knew. All was well until one year the cable was crushed when run over by a hotel cart stacked high with chairs for a conference. OOPS! Things were never the same in the game room.

Much of this occurred before there was an Association for Pathology Informatics! Does anyone remember the fledgling attempts to create the “International Society of Pathology Informatics?” Fast forward forty years and it's a different kind of game. High speed networks, high powered workstations, and high-resolution monitors are inexpensive commodities. WSI and AI are changing the conversation not only in pathology, but in medicine and the future of patient care. At one point, I told a mentor that I was planning to practice informatics full time and make it the focus of my career. He was deeply concerned that I would be unemployable and advised against it. I was scared. There was no charted road or even a path, but the future seemed to clearly point to the way of informatics. I always worried about ignoring your advice Dr. Weinstein, but in the end, I don't regret that I did. It has made all the difference.



*Top left (left to right): Drs. John Gilbertson, Anil Parwani, Michael Becich, J. Mark Tuthill, Ulysses Balis.*

*Bottom right (left to right): Ray Aller, Walter Van Tillburg, J. Mark Tuthill, Bob McGonnagle, Walter Henricks, Bruce Friedman.*



*Bottom left (left to right): Drs. J. Mark Tuthill, Michael Riben, Liron Pantanowitz.*



## ULYSSES BALIS

PI SUMMIT CONFERENCE DIRECTOR

# TO SUCH GREAT HEIGHTS



### INFORMATICS THROUGH THE PRISM OF EVOLVING COMPUTATIONAL PLATFORMS AND STORAGE MEDIA

My 40+ year journey in the use of computational platforms and the application of such technologies toward pathology informatics-related topics is indeed a rich one, filled with curious twists and turns.

What this journey has impressed upon me is a recurring theme of how incremental bumps in computational capability or data storage equate to quantum jumps in capabilities or possibilities for being able to carry out increasingly meaningful and difficult tasks, with each passing iteration of the available hardware for a given era. As such, I find it illustrative to assemble a select sequence of vignettes that highlights the "art of the possible" at various epochs in my career, based on the available hardware of the time. What is most compelling for me when looking at the progression over four decades, is that the jumps are not uniform – they are exponential, both in numerical scale as well as in functional implications of such scale for realizing real-world solutions for increasingly complex computational tasks.

1978 — I am working on a Digital Equipment Corporation PDP-8 mini-computer, with 32K of memory (considered as being a medium-to-large minicomputer for that time), writing a program to integrate HPLC peaks coming off a C-18 column being used to measure vitamin D levels. The dedicated instrument, a Vidar Integrator, does not have sufficient time resolution, and as such, the PDP-8 with its greater speed and memory capabilities, and tape storage (256K per tape), is deemed a better platform. The resultant program, written in Fortran 77, takes 35 minutes to individually integrate the multiple peaks intrinsic to every column run, with this analysis being at least a factor of ten better in both speed and accuracy than the Vidar platform. Typical data set sizes are 5 kilobytes per run.

IBM Personal Computer (Model 5150)



1981

I gain access to the IBM 5150 personal computer, which has been upgraded with a 20 Mb hard disk (Rodime) and 640K of memory. It's computational speed far exceeds that which is possible with the former DEC platform, allowing me to start experimentation with single static images. High-resolution images are, at this time, 640 x 480 pixels (which is of course, laughable by today's standards). Application of a single image-sharpening operation takes 15 minutes).

The VIDAR Integrator instrument being replaced by the a full-featured peak integration program, as deployed on the PDP-8e minicomputer.



The PDP-8e mini-computer with typical DECtape drives used for data storage.



Note: Timeline not to scale.

(CONT'D)

1990

Working on Hewlett-Packard PA-Apollo workstations in Bruce Lindsey's Lab, I am able to carry out neural network simulations of respiratory rhythmogenesis, in tandem with the development of a visual editor to assist in the refinement of such models. This is a monstrously large and powerful workstation for that era, with 1 Gb of memory and 40 Gigabytes of available disk storage. These efforts lead to a publication that demonstrates the utility of pairing computational models with experimentally generated data, surfacing the existence of a previously undetected neuron class in the overall phrenic ramp neural network of the cat brainstem median raphe nucleus.



HP PA-Apollo 8000 RISC-based high-performance workstation

1995

During my pathology residency, I am able to utilize Pentium-class workstations to shuttle real-time H.264 digital imagery of histology between the University of Utah Health Sciences Campus and the Adjacent ARUP reference lab. These machines benefited from 8 GB paged memory and 10 GB hard drives with the network connection being 10 megabits.

The original Pentium processor, which opened the general computing community to applications requiring high-performance computing and concurrent code execution, where multitasking programs could accomplish multiple tasks at the same time.



1984

Working on G. Allen Johnson's research team at Duke, still as an undergraduate, I gain access to a much larger computational resource: a PDP VAX 11/780 super-mini computer with 64 megabytes of memory, attached to an Adage frame buffer (a device capable of rendering a 1024 x 1024 grayscale image on a high performance CRT monitor. This allows for histogram equalization of digitized chest x-rays in less than five minutes, thereby improving contrast of features in the mediastinum. This experience cements for me the long-term interest of focusing my career on medical imaging.

VAX 11/780 Super-minicomputer



1992

After several years of preparation, I am successful in demonstrating digital image transfer of microscopic images (at 640x480 / 24 bit color resolution) between the James A Halley VA and the Bay Pines VA hospital, as a "blazing" 0.25 frames per second. The 80386-based workstations have 4 GB of paged memory and a 2 GB hard drive, which is quite large for that time for personal computer class workstations. The demonstration is a success in showing that diagnostic quality digital histology images could be transported by low-cost telecommunications methods (via 19.2 Kbaud modems over a standard telephone line).

2000

At the completion of my post-doc in tissue engineering at Harvard's Center for Engineering In medicine, I am able to utilize the contemporary Pentium workstations of that era to fabricate a bioreactor monitoring and control system with processes megabytes of telemetry data per second (oxygen tension, flow rates, temperature, differential pressure, calculated oxygen consumption rate, etc.). This is a watershed event for me, as it becomes evident that computers are now fast enough to carry out both data acquisition/transport and analysis at the same time.

(CONT'D)

2006

Just prior to professionally relocating from Mass General's Pathology Department to the University of Michigan, I have the opportunity to equip MGH's storied Putschar Conference Room with real-time HD-video microscopy projection, operating at 1920 x 1080 progressive scan resolution at 30 frames per second. At this time, this was an extremely expensive technology, which necessarily made use of commercial broadcast units to realize this level of resolution and frame rate. The supporting Pentium-based workstations were of equally high-end caliber, with over 8GB of system memory and a 100GB network connection.

2010

Working with Jerome Cheng and later, Jason Hipp, my Informatics fellows at that time, we develop and introduce Spatially Invariant Vector Quantization (SIVQ), which allows for pixel-level segmentation of whole-slide images. The machines that enable this computation have at least 16 GB of memory and several hundred GB hard disks, in order to accommodate the libraries of whole slide images needed to train such algorithms.



Contemporary VIPR Studio Application: Whole slide images can be segmented in real time.



Original SIVQ user interface: Users could easily generate image segmentation pipelines with this single application.

2023

Now, a full 40+ years later from the time that I first embarked on the use of computational tools to acquire and analyze biological data, I have routine access to Petascale computation and storage, with this allowing for deployment of enhanced versions of image analysis tools such as the SIVQ-derived VIPR application, where whole slide images can be segmented in real-time.

Over this time, the scale of computation tools available has increased by at least six orders of magnitude, representing an unimaginable increase in computing potential, as taken from the vantage point of someone who might have explored this space back in 1978. It only reasons that the specialty of Pathology Informatics should expect similar quantum jumps over the next 40 years. If anything, the incremental gains in capabilities over the following decades will be even more impactful, given the rapidly expanding capabilities of AI, including convolutional neural networks, large language models and reinforcement learning. The real challenge in the years ahead will be in the collective specialties of pathology succeeding in training its next generation of practitioners to be able to effectively make use of all that informatics has to offer.

# BEHIND PI SUMMIT AND THE WOMEN OF API:

*From the desk of Nova Smith*



REBECCA BOES

Programmer / Web Developer  
Electronic Communication Staff



NOVA SMITH

API Executive Director  
Senior Conference Manager  
JPI Co-Managing Editor



BETH GIBSON

Operations Manager  
Conference Manager



GRACE CHAE

Executive Assistant  
Marketing & Events Coordinator  
Managing Editor, JPI

Shortly after I began working at the Department of Biomedical Informatics (DBMI), I started my long journey with API. At the time, Dr. Ronald Weinstein was President of API and Phil Boyer was in the middle of his more than a decade-long role as API's Secretary/Treasurer. Chuck Dizard was at the operational helm as the Executive Director with Barb Karnbauer as Conference Manager, and Becky Boes as API's then (and current) web developer. I spent most of my early career working in healthcare, first in the Psychiatry Department at Allegheny General Hospital, and then later, as a Regulatory Affairs Specialist for the National Surgical Breast and Bowel Project. Following these stints, I worked for the Institute on Development and Disability at Oregon Health Sciences University during a brief time living in Portland, Oregon. However, Pittsburgh has always been home for me, and it has a special way of calling people back. I was hired at DBMI after my retail business in Pittsburgh was forced to shutter its doors in June of 2010. After my first few months at DBMI, my entrepreneurial spirit motivated me to become more involved in API. Who knew it would lead to a full-time career?

I began handling membership, but as the organization grew and our collective vision grew, I began to take on more responsibilities supporting Chuck and the API Council, as well as managing the day-to-day operations of the association. As time passed, it became a running joke to see how many titles we could add to my position! Chuck was a fabulous mentor and is still a good friend, so it was a sad day when he announced his retirement. However, this created an opportunity for me to step into the position as Executive Director and support an organization and the people involved, who had fast become like family to me. In 2014, Pitt DBMI withdrew its support of the organization, Barb Karnbauer stepped down as Conference Manager, and Bruce Friedman also stepped down as Conference Director. Fortunately, Dr. Ul Balis and Dr. J. Mark Tuthill took over as Co-Conference Directors and Beth Gibson and I took over Barb's duties as Conference Managers, with Dr. Friedman staying on the planning committee for the meeting to help guide us with his wisdom.

The 2015 PI Summit meeting had me scrambling to find people to staff the meeting, as I had no staff! I was the sole employee of API, apart from Beth's help with the conference and I was fortunate enough to recruit the help of people from my friends, family, and former co-workers to help staff the meeting. And indeed -- they have come back each year since that humble beginning, taking vacation time from their regular jobs to be a part of the API/PI Summit family! Thank you to Tina, Ermi, Michelle, Myra (and Catrina who isn't with us this year)!

I love being a part of this organization and I appreciate the opportunity to work closely with so many incredible people. I am appreciative of the support, mentorship, and camaraderie that I've found with those pathologists who have spent countless hours volunteering their time to serve on the API Council, API Committees, and particularly those on the PI Summit Planning Committee with whom I have met on a biweekly basis since June 2014. However, I would be remiss if I didn't take a moment to acknowledge the women of API starting with Grace Chae, who joined API in early 2021 as my assistant and JPI Managing Editor. I also have the pleasure of working with our long-time web developer Becky Boes and Beth Gibson from the University of Michigan, who has been my Co-Conference Manager since we took over planning the logistics of the meeting in 2014.

I also want to acknowledge our women leaders in the organization, who have participated on API Council over the last 14 years. Dr. Myra Wilkerson was API's first female President (2009-2010), with her playing a critical role in establishing API as a registered non-profit association. Dr. Alexis Carter took on the role of API President in 2014, and we continued to grow under her leadership as API transitioned to a standalone association outside of the University of Pittsburgh. Under Dr. M.E. (Doc) de Baca's presidency (2019), API strengthened our collaborative relationships with other associations. Dr. Mary Edgerton (2020) helped the association stay the course through a worldwide pandemic that presented many challenges, including the cancellation of PI Summit and the need to quickly pivot to virtual events. This year, we are led by Dr. Ji Yeon Kim, who is working closely with Grace, myself, and the API Council to develop new programs and educational opportunities for the API membership.

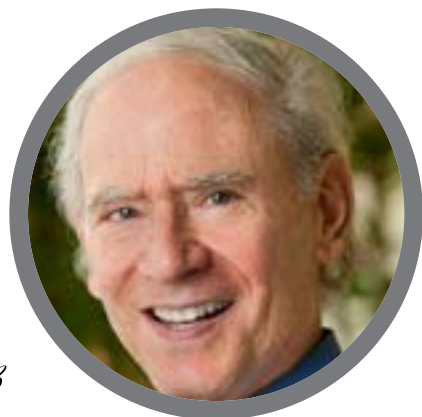
Other women have also greatly contributed to API. Dr. Mehrvash Haghighi served for many years as the Chair of the API Membership Committee. Dr. Veronica Klepeis served as Co-Chair of the Training and Education Committee and as Program Committee Chair. Dr. Kinjal Shah served as API Training and Education Co-Chair and created the API "Mentoring Monday" series. Current members of the API Council are Dr. Michelle Stoffel, who is currently serving as the Co-Chair of the API Training and Education Committee, Dr. Jennifer Woo, who has taken over the reins of API Membership Committee, and Lisa-Jean Clifford, who currently serves as API Secretary and member of both the PI Summit Planning Committee and the PI Summit Topic Review Committee.

I would also like to thank the many women who have served as members on API Committees and who have participated as speakers at our in-person and virtual events. API is stronger because of their contributions to the organization, and I hope that more women will volunteer their time to serve on API Committees. Thank you all for being here and being a part of the Association for Pathology Informatics and the PI Summit!

# A PERSONAL HISTORY OF PATHOLOGY INFORMATICS & THE LAB INFOTECH SUMMIT

by Bruce A. Friedman, M.D. / April 24, 2023

2002, 2003 API PRESIDENT • CO-FOUNDER OF PI SUMMIT WITH DR. MICHAEL BECICH



The current, annual Pathology Informatics Summit is managed by the Association for Pathology Informatics (API). However, it traces its roots back to the University of Michigan Medical School (U of M) in May, 1983. I had been invited to join the pathology faculty a decade earlier in 1973. I started my career, fresh out of the U.S. Army, as a blood banker and spent nine years in that field. In February, 1982, I was asked by the Chairman, Dr. Peter Ward, whether I would like to be appointed as the director of the fledgling group that managed the departmental Laboratory Information System (LIS). He offered me the position as a temporary arrangement because he said that he “would subsequently search for someone who was technically qualified for the job.” This was a very relevant observation on his part because I had virtually no training in information technology. Apparently, no one who met his criteria subsequently came to his attention because I held the position for the next twenty-four years.

These were the early days of lab computing. The software for our “turnkey LIS” was provided by MedLab and the hardware by the Digital Equipment Company. MedLab was based in Salt Lake City and had been founded by Dr. Homer Warner, a pioneer in medical informatics at the University of Utah. A turnkey LIS meant theoretically that one only needed to turn on the computer and it would meet the lab computing needs. This was far from the truth. The function of the LIS management team at UM in these early days, Pathology Data Systems, was to babysit the computer and interact with the vendor to improve system functionality and correct any of the bugs that appeared on a constant basis.

Worthy of note here is that the lab computing team in Pathology at U of M was separate and distinct from the hospital central computing group—we even had our own machine room. The director of the hospital central computer, referred to as “the mainframe,” reported to the Chief Financial Officer of the hospital. This was about the time of the emergence of the title of Chief Information Officer, a term coined in 1981. The software for this system was supplied by IBM which had a virtual monopoly at that time on these large hospital systems.

Initially, the central computer team had no clinical

responsibilities in contrast with their management of EHRs today that incorporate modules for pathology and radiology support. Instead, the mainframe computer supported patient management tasks such as admissions, discharges, bed transfers, and patient billing. The computer had a scheduled, roughly six-hour “down” every night for backing up the day’s work. It also seemed to be down most of the weekend hours.

LISs were the first example of clinical computing in hospitals. Patient test results were printed daily on fanfolded, computer paper in the pathology machine room and delivered to the patient units, replacing the previous lab shingle sheets that were pasted by hand into the patients’ medical records. The next clinical systems to emerge in the hospital computing milieu after LISs were the radiology information systems (RISs). They were managed by radiology department personnel, similar to the case in pathology.

The “Old Main” hospital at UM was replaced in 1986 with a brand-new building. Deployed in patient care units were computer monitors that enabled physicians and nurses to query the LIS for laboratory test results prior to receiving the printed reports. Unbelievably and different from today’s technology, each of these devices were connected to the LIS by home-run cables. Miles of such cables probably remain dormant underneath the floors of University Hospital to this day.

A computer network was soon installed in the new hospital. Initially, there were occasional “data collisions” on it. I was a staunch supporter of computer networks but, in some quarters, they were considered unreliable. I was even involved in a discussion at a national pathology meeting with a pathologist-informatician about this new technology. At that time, he referred to them as “notworks.” In today’s computing environment, we often undervalue the importance of our current, global, high-speed networks.

In these very early years in Pathology Informatics (PI), there were only two other pathologists in the country, Drs. Ray Aller and Don Connelly, who had deep experience in the management of LISs. I depended on both of them for help and guidance in learning the ropes of my new job. I cite this fact to emphasize how much one needed to scramble in those early

days to find and learn from colleagues about the LIS’s that were totally responsible for reporting to clinicians the test results generated in the clinical labs and surgical pathology.

Because of my personal circumstances and the early state of the field, it occurred to me that launching an annual conference at UM would solve many problems. First, it would serve as a gathering place for the scattered and newly emerging informaticians to share their ideas and experiences. Equally important was the fact that there were then emerging a growing cadre of vendors, LIS manufacturers of various stripes, who I thought would jump at the opportunity to show their products and also make such a conference more financially viable. I decided to name the new conference AIMCL, standing for Automated Information Management in the Clinical Laboratory.

I feel privileged to have developed, in these early days, a warm relationship with many of the founders of these LIS firms including Dr. Sid Goldblatt, the CEO of Sunquest, now Clinisys, and Neal Patterson, one of the founders of Cerner. Cerner, now one of the two major EHR vendors, was launched as an LIS. Neal was very ambitious as the later growth of Cerner will attest. He urged me to expand the scope of AIMCL to include nurses. He was obviously moving in the direction of much higher clinical functionality for the LIS successors. I pushed back, insisting that serving pathologists and their need for more training in information technology (IT) was a sufficient challenge for me.

I must confess that I experienced little anxiety in launching a new conference because I had previously been the director of an annual conference in blood banking for nine years. Moreover, the University of Michigan Medical school had a unit devoted to the support of continuing medical education (CME). This “Towsley” group provided me with very useful skills in promoting and managing such events and also access to a large auditorium with ample space for vendor exhibits. We printed both a mailer announcing each conference and a hefty, bound conference syllabus. Medical conference marketing and support these days is generally restricted to the Internet for efficiency and cost savings.

The term pathology informatics (PI), now broadly used to refer to our subspecialty, did not enter the literature until 1990 in an article I published in the American Journal of Clinical Pathology. The word informatics was derived from the French word *informatique* which referred to data and computer processing. In those early days, I thought much less about PI as a subdiscipline of the broader field of pathology and more as a tool that would be understood and utilized by all pathologists. Hardly shocking these days is the fact that PI has evolved as a robust subdiscipline of pathology. This trend continues even more of late with digital pathology and artificial intelligence (AI) requiring even more specialized talent and management expertise. AI is rapidly becoming a critical tool in the automation of both AP and CP.

There is an adage that, when choosing a career, it’s best to select a discipline for which there is “no name.” Happily,

this was the path that I chose or perhaps, more correctly, was assigned to me. I must confess that I did pursue this career with some understanding about how PI would eventually evolve as a robust discipline. I would thus provide the following advice to physicians just launching a career: If you begin to work in an “unnamed” discipline or subdiscipline of an existing field, contribute as much as you can to building the infrastructure and thus prepare for those who will follow. Also, try to ignore the naysayers who often are mainly defending the status quo. One executive of a pathology organization said the following to me: “A computer is a tool like a pencil. We don’t have any pencil conferences. Why would we have computer conferences?”

Remarkably, AIMCL continued annually and successfully for 21 years in Ann Arbor after its launch. Unfortunately, I began to experience some disagreements over the years with the CME personnel about the management and marketing of AIMCL. Some of my complaints were related to the fact that, in my opinion, the CME unit was unable to respond to the continuing growth and subsequent demands of the conference and the larger pathology informatics field. In 2004, I decided to move the conference from Ann Arbor but I was now faced with new challenges and questions such as how to manage it independently and where it would be held?

I decided to create a 501(c)(3) non-profit organization called Pathology Informatics Consortium whose sole mission was to manage the conference, now rechristened as the Pathology Informatics Summit. The creation of PEC was partly at the urging and advice of Dr. Mike Walsh, head of the pathology group at The Toledo Hospital, now ProMedica Toledo Hospital. He was very entrepreneurial whereas I had led, up to that time, a more “sheltered” academic life.

I then needed to make one more decision: What would be the venue for this now unmoored conference? I decided to move it to the Venetian Hotel in Las Vegas. In retrospect, this was a major decision. Partly because of the appeal of Las Vegas to registrants and vendors, the meeting thrived there for six years starting in 2004. On the negative side of the ledger, the cost of the meeting rose considerably which posed a threat to my “little nonprofit” with only scanty financial reserves. My wife, Hillary Murt, contributed greatly to the success of the meeting in Vegas. It was a large time and energy commitment for the very small cadre of people connected to my non-profit organization.

I subsequently decided in 2010 to terminate the Pathology Informatics Summit after six years in Las Vegas and the 21 previous years as AIMCL. However, I was undecided as to whether it would or should continue in some sort of reincarnation under different management. I would not have even considered shutting it down if APiII, another pathology informatics conference, has not been launched by Mike Becich in 1996 and was thriving. APiII stood for “Advancing Practice, Instruction, and Innovation through Informatics.”

Mike and I had always worked closely together. He had discussed with me whether it was appropriate for him to launch another meeting alongside AIMCL at its inception. I told

him at the time that the more the merrier, particularly at the University of Pittsburgh which at that time and since, has had a robust national reputation in the field. I got a call from Mike in 2010 when he learned that I was about to terminate AIMCL and he suggested that I consider merging it with APIII. This immediately struck me as a wonderful idea so I joined the Pitt team. The name of the new, merged conference was changed to Pathology Information Summit, the same as the Las Vegas meeting. This name continues to this day.

In the early days after the merger, the APIII planning team included myself, Barbara Karnbauer, Chuck Dizard and Dr. John Gilbertson. Chuck was the Administrator of the Department of Biomedical Informatics with Mike as the chairman. Chuck was a major player in the management of the now merged conference after I joined the team and kept us on the straight and narrow from a budgetary perspective. Nova Smith joined the merged conference planning group two years later and immediately became a major contributor to its success. She, of course, went on to become the Executive Director of the Association for Pathology Informatics and continues in this role to the present time.

At this point, I also want to recognize the critical role that Bob McGonnagle, publisher of CAP Today, played in the success of AIMCL and the merged meeting. Bob believed in the field of pathology informatics from the earliest days and was a constant source of support and encouragement. Moreover, he attended all of the meetings and very often served as a faculty member. This was in the face of tepid interest in PI in some of the pathology and lab medicine professional societies in the early years. To this day, his support for the conference continues unabated.

Important to know at this point is that the Association for Pathology Informatics (API) had been founded in 2000 by a small group of pathologists specializing in the field. It was a natural choice to eventually manage any preexisting conferences like the Pathology Informatics Summit. Mike Becich and I were selected as the founding presidents with Mike serving the first term. The natural and physical home for this new society was the University of Pittsburgh Medical School which, of course, was Mike's territory and which continues as such to this day.

As you all know, API has thrived since its inception, albeit on a relatively small scale. Also, important is that it was very unusual for a conference in a specialty to be developed prior to the creation of the medical society in the field. Usually, the opposite takes place – the society itself launches the conference. But this "inversion" has not caused any problems over the years with a smooth integration of the previously existing conferences into the API operations.

API has consistently been the initiator and sponsor of various activities to coach pathology trainees in Pathology Informatics. Most notable has been an annual program to cover the meeting and travel costs of a group of pathology trainees (the Travel Awards) to the Pathology Informatics Summit. Nearly all of the leaders in our field today have participated in

this program over the years. I am also very pleased to note that two current pathology informaticians, Drs. Mike Feldman and Liron Pantanowitz, are now chairmen of two major pathology departments. Quite a record in a field that has roughly been in existence for only about four decades.

I have tossed around a number of dates in this article which may be difficult to mentally juggle. Therefore, and below, I offer a simple table with the timeline in the evolution of today's Lab Infotech Summit and Pathology Informatics:

First AIMCL conference at the University of Michigan in Ann Arbor	1983
Naming of the field of Pathology Informatics	1990
Formation of the Association for Pathology Informatics	2000
AIMCL renamed Lab Infotech Summit and moved to Las Vegas	2004
Merger of Lab Infotech Summit with AIMCL and located in Pittsburgh	2010
40th Anniversary of the Lab Infotech Summit and its precursors	2023

So, what is there to now add about this tangled history the Lab Infotech Summit. Despite the twists and turns over four decades, it continues as the preeminent PI conference in the country and has helped to teach and nurture a host of practitioners to this day. Most important, it has remained autonomous and free of any shackles that could have been imposed on it had it merged with some larger medical society.

What the future holds for all of us is somewhat unknown. However, we need to continue to hold fast to the idea that the US healthcare system must undergo major reforms in order to reduce the cost and increase the quality of healthcare on a national scale. Both Pathology and Radiology, which is to say diagnostic medicine, will play major roles in these reforms. Simply stated, most such improvements of our healthcare system will depend greatly on increased automation and AI in the delivery of all healthcare services.

On a yearly basis, the API and Pathology Informatics Summit will surely take a leadership role in these reform efforts. Also, and as before with AIMCL, the path may be twisted and complex but the goals will continue to be obvious to all of the participants. This year marks the 40th anniversary of our conference. We need to celebrate where we have come from and also where we are headed with the able support and leadership of the pathology informaticians now scattered across the country.

# MEET THE TEAM



Dr. Liron Pantanowitz  
Co-Editor-in-Chief



Dr. Anil Parwani  
Co-Editor-in-Chief

## Journal of Pathology Informatics



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Grace Chae, Managing Editor, [grace.chae@pathologyinformatics.org](mailto:grace.chae@pathologyinformatics.org)



# Q&A WITH DR. MICHAEL BECICH

2001 API'S FIRST PRESIDENT · CO-FOUNDER OF THE PI SUMMIT WITH DR. BRUCE FRIEDMAN

**Dr. Becich, you are well regarded as a pioneer in the field of pathology informatics and you were there at its emergence and continue to be a moving force in the discipline, with particularly interesting insights on education. How would you compare your training experience with what is available, today, with rising medical trainees? Is the grass greener on this side or do you prefer or miss the Wild West?**

My training was as a health information technology (HIT) focused faculty member responsible for the Anatomic Pathology Laboratory Information System (APLIS). I was responsible for implementing a new APLIS' at Washington University (WashU) and University of Pittsburgh Medical Center (UPMC). We implemented CoPath (at that time owned by Collaborative Medical Systems (COMED), subsequently Dynamic Healthcare Technologies, Ind and currently licensed by Sunquest and owned by Cerner) and my role which was significantly influenced by COMED's Marianne Boswell, Partner and Vice President of Sales and Marketing. My HIT work in those early days was in partnership with William Gross, my LIS manager whom I initially hired from Digital Equipment Corporation in 1988 to join me as an Instructor at WashU, St. Louis. Bill was skilled in VMS (COMED CoPath's operating system at the time) and joined me in Pittsburgh in 1993.

At UPMC, Bill and I and our team were responsible for the replacement of the APLIS systems across

The "Wild West" days of on-the-job training (OJT) in informatics in my opinion are over as Biomedical Informatics, Data Science and Computer Science training is now firmly established as fundamental to training the next generation of informatics faculty.



Associate Vice Chancellor for Informatics, Health Sciences; Distinguished Professor and Chair, Department of Biomedical Informatics, School of Medicine; Associate Director for Cancer Informatics, UPMC Hillman Cancer Center; Associate Director, Clinical and Translational Science Institute

the growing UPMC network of approximately 40 hospitals on one consolidated instance. We co-developed many modules with Marianne Boswell for CoPath including the histology ordering, synoptic special procedure reporting modules and the first integrated imaging system and molecular diagnostic reporting modules. This "hands on" problem solving through the APLIS was the only informatics related training I received. I am an MD Pathologist (AP-only), and my PhD is in tumor cell biology/experimental pathology (from Northwestern University). Thus, regrettably I have no formal training in informatics, computer science or programming. The "Wild West" days of on-the-job training (OJT) in informatics in my opinion are over as Biomedical Informatics, Data Science and Computer Science training is now firmly established as fundamental to training the next generation of informatics faculty. Clinical Informatics board specialty training remains a viable alternative pathway for those focused on HIT jobs like Director of Pathology Information Systems, Chief Medical Information Officer (CMIO) or leading an HIT Division of Medical or Surgical subspecialties. I clearly prefer

# Q&A WITH DR. MICHAEL BECICH (CONT)

the current opportunities formal training in informatics provides. I strongly suspect visionary health care systems will replace OJT trained informaticians with formally trained informatics faculty in Biomedical Informatics, computer science and/or clinical informatics fellows who are subspecialty board certified.

**Pathology informatics is a field in which the development of technologies emerges from both industry and hospital/academic institutions. How would you characterize these relationships or interactions? What does adoption of technology look like throughout the healthcare spectrum, meaning how do the experiences of early adopters differ from those groups that might just be starting to explore? What are the pros and cons at the different spectrum ends?**

Both hospital/academic institutions and industry have shaped Pathology Informatics tools in the past, but we are at an inflection point in which the Laboratory Information System (LIS) industry is ripe for disruption. Many healthcare systems are moving towards unified and monolithic electronic health records (EHR) and fueling this is "open" record sharing initiatives like the All of US research program, Enhancing Accrual to Clinical Trials, the Patient Centered Outcomes Research Institute (PCORI) Clinical Research Network (PCORnet), the National COVID Cohort Collaborative (N3C) and Consortium for Clinical Characterization of COVID-19 by EHR (4CE). Unfortunately, the LIS has not kept pace

Both hospital/academic institutions and industry have shaped Pathology Informatics tools in the past, but we are at an inflection point in which the Laboratory Information System (LIS) industry is ripe for disruption.

or enabled these national and international data sharing initiatives and most notably has been the impact of COVID. Lack of laboratory information standardization, lack of agreed upon ontologies and ignoring of the impact of genomics (especially microbiomics and personalized medicine) in LIS impact in medicine. Finally the most damaging of the current trends is the ineffective "search" tools HIT wide in EHRs. This continues to handicap "the 70/70" rule which was once robust and now flagging due to lack of innovation in our pathology information systems. The time for disruption is ripe and the "takeover" of LIS systems by EHR vendors is going to really hurt Pathology unless we get to work...and fast!

**When medical and/or research institutions collaborate with private industry in the development or adaptation of new systems/technology, what things would you put on your checklist to assess how things are moving along? With so many resources, time and money invested, how does one know when the technology limits adoption or how to determine if one should settle and accept the limits or start anew?**

As stated above in question #2, the LIS (and EHR) industry is ripe for disruption. The most important single way to influence this is to progressively recruit programming and technology aware trainees and leadership into Pathology Informatics (as well as Pathology in general). As an important hub for medicine information sharing the laboratory needs to evolve and Pathology Informatics, Molecular Diagnostics and Microbiomics must innovate and keep pace with the needs of the modern clinician and the "quantitative self" patients are evolving to today. As a Pathology Informatics community, we must pay attention to "patient-centeredness" and understand how important laboratory tests are to our real customers.

# Q&A WITH DR. MICHAEL BECICH (CONT)

Evolving to keep pace with medical innovation and patient's needs in a highly fragmented health care system is key to our future successes.

**Where do you think we are headed over the next 10-20 years? What will the endgame at this time point look like to both patient and provider?**

Pathology Informatics has a bright future only if we realize the need for true innovation. We must return to the central information and quality improvement foundation Pathology has in serving medicine which was long embraced as key to its success. Pathologists must move to the important role as ally and consultant to our medical and surgical colleagues. We must realize the need the health sciences have for our quality assurance, quality control and quality improvement expertise. Medical errors continue to plague healthcare delivery and we can serve the new patient safety focus of the federal government as leaders in medical care. Pathology information is key to that success along with artificial intelligence and machine learning in clinical decision support. The Regional Autonomous Patient Safety (RAPS) initiative of the Pittsburgh Jewish Healthcare Foundation and Pittsburgh Regional Healthcare Initiative are early signs of the change that are coming to the federal patient safety goals.

**If you could create a tasting menu of missing technologies for pathology, what would be on that course menu? In other words, what would be on your wishlist of things that have yet to be done to get patient care closer to where you think it needs to be?**

Evolving to keep pace with medical innovation and patient's needs in a highly fragmented health care system is key to our future successes.

Medical errors continue to plague healthcare delivery and we can serve the new patient safety focus of the federal government as leaders in medical care.

This is an interesting question that took a bit of thinking. The easiest and most immediate answer is the "fourth wave" of artificial intelligence and machine learning we are currently undergoing, especially causal discovery algorithms. However, on deeper reflection, I say the big three changes needed for pathology are all diagnostic and theranostic innovations, including: 1) true implementation of precision pathology (and medicine through the LIS), 2) implementation of modern microbiomics in the microbiology laboratory due to the rise of superbugs and pandemic threats and 3) realizing the promise of modern molecular pathology supported by our laboratory information systems. We are a long way away from making Pathology central to these three aspirational (yet obvious) goals for Pathology and Pathology Informatics. Will you be part of the future? If so, come to the Pathology Informatics Summit in 2023 and learn how to join our quest. It has been an exciting ride in our first 27 years since the 1996 APIII meeting, and I assure you the best is yet to come!

If you are interested in volunteering for the Association for Pathology Informatics or any of its associated branches, please contact:

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Grace Chae, Executive Assistant  
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We'd love to have you!

# PODCAST

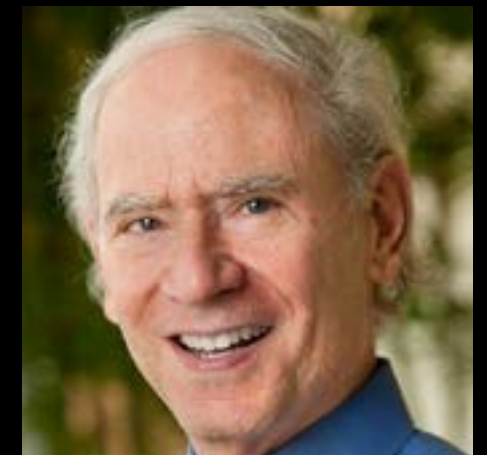
## REGALING ACCOUNTS OF THE EARLY YEARS OF PATH INFORMATICS



The Story Voice | Mary Edgerton, MD, PhD  
*2020 API President*



MICHAEL BECICH, MD



BRUCE FRIEDMAN, MD

SPECIAL GUESTS

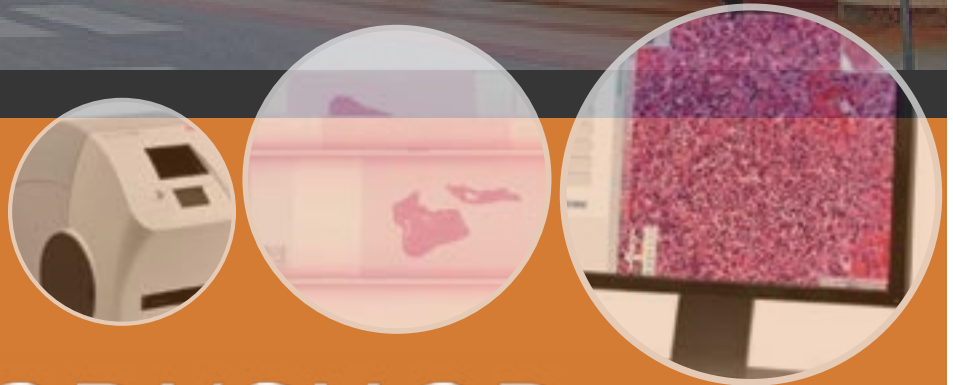
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SAVE THE DATE  
SEPTEMBER 28-30, 2023  
• LIMITED SPOTS •

MAYO CLINIC  
ROCHESTER, MN



# DPAI WORKSHOP 7.0

**SAVE THE DATE:  
MAY 20-23, 2024**



Brush off your clubs, restring those rackets, pack your walking shoes, or maybe just be ready to pull up a chair...

## Pathology Informatics Summit 2024

Ann Arbor Marriott  
Ypsilanti at Eagle  
Crest Resort  
Ypsilanti, MI