

# Medical Connectivity

Tim Gee

Principal, Medical Connectivity Consulting

503.481.2370 tim@medicalconnectivity.com Beaverton, OR

## Profile

Over twenty five years embedded system and software product development focused on workflow automation through the integration of medical devices and information systems. Expert in the application and integration of general purpose computing and network technologies with medical devices. Technology expertise includes software architectures, wired and wireless networks, mobile computing, indoor positioning (RFID), embedded systems, wireless radios, and related industry standards and regulations.

Key skills and expertise include in depth knowledge of health care delivery including operations in hospitals, outpatient care, physician practices, alternate sites, home health, and payors. Knowledge of clinical operations include critical care, surgery, recovery, telemetry, general patient care areas, variable acuity units, and the emergency department. Diagnostic departmental knowledge includes radiology, cardiology, endoscopy and the clinical lab. Provider oriented skills include needs assessment, workflow analysis, system design, and vendor selection.

Product marketing and market management skills include full product life cycle management of hybrid medical device/information system products, from inception to end-of-life. Market opportunity assessment includes competitive research and both qualitative and quantitative market research (including focus groups, use case elicitation and conjoint analysis). Product strategy skills are based on experience assessing company core competencies, market requirements, available technologies and development partners. Experience with numerous connectivity based product introductions has uncovered unique requirements in the areas of whole product solution, barriers to entry, requirements, market education, sales tools and collaterals, and sales training.

Expert in applying medical device regulations to embedded devices, software and medical device connectivity systems, and developing required regulatory strategies. Certified, Quality System Requirements and Industry Practice, AAMI, 2004.

Business development is increasingly an essential component of successful medical device systems. More than 20 years of health care business development have honed skills in the areas of alliances, acquisitions, strategic supplier, distribution channel development and due diligence.

## Experience

### **PRINCIPAL, MEDICAL CONNECTIVITY CONSULTING, BEAVERTON, OR 2004-PRESENT**

Provide consulting to health care providers and vendors. Provider work includes hospital-wide patient flow optimization, departmental workflow, workflow automation at the point of care, and medical device connectivity with Electronic Medical Records. Needs assessment, solution design and vendor selection for connected medical devices, indoor positioning systems, and other workflow automation systems are also provided.

Vendor consulting includes business strategy and planning in support of product development, new product launches and device life cycle management. Assists with business and product strategy for connectivity, and business planning of connectivity impact in R&D, regulatory, manufacturing, finance, service, support, sales and marketing.

A list of some clients and brief description of projects can be found [here](#).

### **MARKETING DIRECTOR - HOSPITAL MONITORING SYSTEMS, WELCH ALLYN, BEAVERTON, OR 2003-2004**

Founded in 1915, this privately held medical device company manufactures, sells and services a variety of products for the physician office, alternate care and hospital markets. Approaching \$1 billion in annual sales.

Managed product marketing and market management team focused on wired and wireless monitoring systems for ED, Telemetry, Med/surg, and ICU. The hospital-wide monitoring system provides surveillance outside traditional critical care areas. The system facilitates variable acuity patient care delivery; improving patient flow and reducing patient transfers.

- Advanced technology work included wireless primary alarm notification, 802.11 component radio development, and wireless sensor based patient-worn monitors.
- Leveraged in-house requirements using outsourced off-shore R&D to develop major project without adding head count.
- The Systems product team has the best record in the company for completing projects on time and on budget.

**BUSINESS DEVELOPMENT/OFFER MANAGER - WIRELESS DATA, HEALTHCARE, AT&T WIRELESS, REDMOND, WA 2001-2003**

Identify market opportunities and define requirements for new wireless data services in health care. Screen and select alliance partners based on distribution, technology and product alignment. Manage new product development with focus on distribution strategy and channel readiness.

Targets included home health, telemedicine and remote monitoring using a variety of wireless telecommunications technologies (CDPD, GSM, GPRS, W-CDMA/UMTS, SMS) and devices (mobile phones, PDAs, lap top computers, embedded radios). Integrated new services into existing operations, including wireless devices, wireless application validation, provisioning, billing, sales and marketing.

**DIRECTOR BUSINESS DEVELOPMENT, POINTSHARE CORPORATION, BELLEVUE, WA 1999-2001**

Pointshare, an eHealth connectivity start-up, automated high volume manual transactions between physicians, payors, hospitals and ancillary service providers. Services included eligibility lookups, referrals processing, coding, and electronic claims via a private wide area network. A darling of venture capitalists during the Internet bubble, the company raised more than \$53 million over six years. Pointshare was acquired by Siemens Medical Solutions in December, 2001.

Increased revenue and sales through alliances with eHealth application companies. Worked with VCs, analysts, executives and engineers to develop business case, screen partners, negotiate terms through contracting and due diligence. Efforts more than doubled services offered at this VC backed start-up.

**VARIOUS POSITIONS, PHILIPS ULTRASOUND, BOTHELL, WA 1994-1999**

As Senior Market Manager, responsible for outbound marketing and strategic alliances with PACS and technology vendors world wide. Assessed channel readiness, defined strategy and training requirements. Adapted corporate business delivery system to support connectivity, impacting global product development, service, sales and marketing.

- Leveraged collaborative marketing with alliance partners to differentiate and add market share resulting in leading all competitors in connectivity in an industry 1998 Buyer Perception Study.

- Developed and implemented a Connectivity Business Plan required to support connectivity based products. The new business delivery system included a systems integration lab, technicians, changes to the product development process, connectivity field engineers, new service products, and sales training. The plan required a \$2 million investment in first year.
- Key contributor to overall product strategy and operations. Responsible for all outbound marketing including: product positioning, sales strategy, needs assessment tools, promotion, collaterals, pricing, proposal and purchase agreement.
- Launched DICOM-based miniPACS on time and on budget, resulting in first year's sales of \$6 million, exceeding budget and equaling or surpassing all competitors.
- As Senior Product Manager, responsible for market research, product requirements, planning and road map. Produced market and product requirements and managed feature-set priorities and trade-offs during product development. Extensive beta site involvement.

**PRODUCT MANAGER - CLINICAL INFORMATION SYSTEMS, COROMETRICS, WALLINGFORD, CT  
1991-1994**

Corometrics invented the fetal monitor in 1968, and the company was acquired by Marquette in 1994.

Responsible for fetal monitoring surveillance and the creation of a fetal monitor archive recorded during birth. Overall product line responsibility including positioning, promotion, market research, product definition, packaging, price and sales strategy. Replaced outdated systems with an integrated CIS resulting in \$9 million in bookings in 1993, a 210% increase over 1992. The new system included a transition from a completely proprietary architecture to applications software running on a general computing platform, significantly reducing R&D cost, regulatory burden, and time to market.

**SALES - HOSPITAL INFORMATION SYSTEMS, BAXTER SYSTEMS DIVISION, CINCINNATI, OH 1989-1991**

Baxter Systems Division developed and sold hospital information systems for small, medium and large hospitals. Baxter spun off the Systems Division into a joint venture with IBM in 1991.

Account management and new system sales in a two state area. Represented all HIS and departmental solutions running on IBM S/370, AS/400 and RS/6000 platforms.

Substantially improved account management, resulting in sales over \$800,000 the first year.

**VARIOUS POSITIONS, TRINITY COMPUTING SYSTEMS, HOUSTON, TX 1982-1989**

Start-up Trinity Computing Systems leveraged the advent of personal computers (the Apple II and IBM PC) to create data analysis, reporting and database systems for various clinical applications including invasive and non-invasive cardiology. Trinity developed a report generation engine and integrated database that was used in a variety of products and sold as a connectivity platform to medical device vendors. After a brief foray with a critical care information system through an association with Spacelabs, Trinity developed and launched a radiology information system - the first PC/LAN client-server based clinical information system.

**MARKET MANAGER 1987-1989**

Developed and implemented an innovative marketing plan repositioning products, addressing changing technologies and markets. Resulted in 66% increase in sales in first year.

**NATIONAL ACCOUNTS MANAGER 1985-1987**

Responsible for over 200 accounts in North America. Developed new department with a staff of five, including new systems and procedures. Personally managed and resolved all major customer complaints. Increased revenues 100% to \$1.2 million in 1987, contributing over 16% of company revenue. The first individual to achieve quota in company history.

**BUSINESS DEVELOPMENT MANAGER 1983-1985**

Developed and implemented strategic relationships with medical device manufacturers helping them add value and differentiate by using Trinity clinical information systems technology. Role included sales and account management, product management, promotion, sales training and product launch.

- Developed and implemented deals with Sarns/3M, Dupont, Corometrics and Mitsui USA. Gained access to four new markets, increasing sales and distribution significantly.
- Heart/lung machine inventor, Sarns/3M sold 23 perfusion information systems in the first year into their most competitive market segment, university hospitals.

**MEDICAL PHOTOGRAPHER, THE METHODIST HOSPITAL, HOUSTON – 1977-1983**

Responsible for creating clinical documentation, publicity and event documentation, patient and employee education using various media. Worked with physicians, caregivers, patients, hospital executives and numerous employees from every ancillary and support department. Media production included photography, cinematography, video production and various black & white and color film and print processing.

**Education**

University of Houston, BA

**Skills**

Due diligence	Regulatory affairs	Workflow requirements elicitation
Workflow automation	Business delivery system reengineering	Risk management
Market opportunity assessment	Competitive analysis and assessment	Product strategy and roadmapping
Healthcare communities and the network effect	Wireless sensors and medical devices	Merging medical device systems and IT infrastructure
Go-to-market	Provider needs assessment and vendor selection	IT/medical device governance reengineering
Systems integration requirements elicitation	Provider technology adoption readiness assessment	Sales strategy development and implementation
Product management	mHealth	Business model development

## Publications

Tim has published the [Medical Connectivity blog](#) since 2006. With more than 1,400 posts, the site is focused on workflow automation through the integration of medical devices and information systems, including enabling technologies. Over the years a select group of contributing authors have joined Tim authoring posts for the blog.

Tim has also published many articles for the trade press and peer review journals. These articles, often done as client engagements or as reportage for the publication, covering a wide range of topics from technology, adoption and regulatory issues. Articles are listed in reverse chronological order.

[Middleware: How It's Changing Medtech, Medical Design & Outsourcing](#), November 2017

[Surveillance Monitoring: Current Challenges and Solutions](#), Patient Safety and Quality Healthcare, scheduled for 2016 publication

[Reframing Medical Device Standardization](#), Journal of Clinical Engineering, April/June 2014

[Three Pillars of Clinical Alarm Safety](#), Patient Safety and Quality Healthcare , March/April 2014

[System Monitors Patient Movement, Improves Reliability of Routine Patient Care Tasks, and Reduces Incidence of Pressure Ulcers](#), Patient Safety and Quality Healthcare, November/December 2013

[Closing the Gaps, 24x7](#), September, 2012

[The IT/Clinical Engineering Governance Gap](#), Patient Safety and Quality Healthcare, July/August, 2012

[Medical Device Interoperability from 30,000 Feet](#), Connectivity Summit, Infusion Therapy and Information Technology - Taking IV Therapy to New Levels of Safety with IT Integration, CareFusion Center for Safety and Clinical Excellence, June, 2011

[Functional Basics of Third Party Alerting and Alarming Systems](#), AAMI Horizons, May 2011

Reducing Alarm Hazards: Selection and Implementation of Alarm Notification Systems, Patient Safety & Quality Healthcare, March/April 2011

The Case for Regulating EMRs, Patient Safety & Quality Healthcare, January/February 2011

Converging the Networks, 24x7, November 2009

Transformation from Wired to Wireless, Continuous to Spot, HIMSS Clinical Informatics Insights, October 2009

Medical Device Networks Trouble Industry, Journal of Clinical Engineering, April/June 2009

Barcoding: Implementation Challenges, Patient Safety & Quality Healthcare, March/April 2009

The Challenge of Automating Workflow, 24x7, October 2008

AAMI Highlights Device Makers' Shortcomings, Opportunities, MX magazine, June 2008

IT Showcase, MX magazine, May 2008

What Will Microsoft's HealthVault Mean to the Telehealth Community? Center for Connected Health, October 2007

IT Showcase, Mx magazine, May 2007

Trends in Point-of-Care Alarm Notification, Patient Safety & Quality Healthcare, January/February 2007

Daylight Savings Time change this year may cause healthcare transaction hiccups, The Healthcare IT Guy blog, February 7, 2007

Is ISO 11073 a Viable Standard? 24x7, January 2007

FDA Reopens Issue of ID System, MX magazine, November 2006

Plug and Pray?, 24x7, November 2006



Mayo Move Breaks Vertical Integration Model, MX magazine, July 2006

IT Showcase, MX magazine, May 2006

An Alarming Matter, 24x7, November 2005

IT Showcase, MX magazine, November 2005

## Interviews

Tim receives interview requests on a regular basis regarding technology, workflow automation, regulatory issues and market adoption issues. Resulting articles listed in reverse chronological order.

Muddy Waters data security report on St.Jude cardiac rhythm devices (6 interviews), Guidepoint Global Advisors, August 2016

Clinical Alarm Management: Bringing the Buzz Under Control, 24x7 Magazine, January 2015

The Transition to Wireless: Risks and Rewards, 24x7 Magazine, March 2014

Top Ten Tech Trends: Paving the Way to the Future, Healthcare Informatics, February 2014

Envisioning the Future: Hospitals Fully Integrated with Medical Device Connectivity Solutions, FierceHealthcare, September 2012

Growing Pains: Medical Device Interoperability, Healthcare Informatics, July 2011

Wireless Device Experts Offer Advice on Working with FDA, AAMI News, December 2010

Conference Highlights Paths to Connectivity, AAMI News, November 2010

Experts Weigh Impact of FDA Official's Departure, AAMI News, April 2010

Ventilator Connectivity, Advance for Respiratory Care and Sleep Medicine, January 2010

CEOs Need To Take the Reins of Software Development Strategy, MX magazine, July 2009

N.C. doctor develops iPhone app for irritable bowel syndrome, The Business Journal, June 12, 2009

Need to Check Your Cholesterol? There Will Be an App for That, Ad Age Digital, June 1, 2009

The EMR: Bridging the Gap Between Clinicians and Technology, Biomedical Instrumentation & Technology, March 2009

Medical Device Integration - CIOs must bridge the digital divide between devices and electronic medical records, Healthcare Informatics, February 2009

Smoothing the Rocky Path of Interconnected Medical Devices, Medical Device and Diagnostic Industry, January 2009

Medical devices lag in iPod age Patients' safety is at risk, experts say, Boston Globe, December 29, 2008 (full text)

Issues Affecting Cardiology PACS Adoption & Sales, on-line interview, EchoChief.com, November 1, 2008

New FDA Rule to Define and Reclassify Medical Device Data Systems, IT Horizons, AAMI, 2008

Hospitals play tag—RFID finds a niche in healthcare, KM World, July 11, 2008

Round Peg, Square Hole, HealthLeaders, September 2007

Kaiser Permanente Contract Drives Connectivity and Interoperability, Medical Device and Diagnostic Industry, July 2007

FDA Reopens Issue of ID System for Medical Devices, MX magazine, September 2006

Maintaining Telemedicine's Integrity, 24x7, August 2006

Maybe RFID? Healthcare Organizations Slowly Expanding Adoption of RFID Technology, For the Record, July 10, 2006

PDA's Chase Workflow Improvements, HealthData Management, May 2006

Span the Digital Divide: Device Connectivity and the EMR, For The Record, not dated

## Speaking Engagements

Public speaking and webinars are a frequent activity. Tim has spoken internationally and served as program chair for numerous conferences. He has also been engaged to present at company sponsored webinars and events. Events listed in reverse chronological order.

Medical Device and IoT Summit, Program Chairperson, Keynote presentation, December 3-4, 2018, Boston

Medical Design Briefs webinar, Connectivity and IoT: What's Next for Medical Devices? webinar presenter and panelist with speakers from Macadamian and Medtronic, September 25, 2018

MCC webinar, The Connectivity Value Hierarchy, August 14, 2018

MCC webinar, Continuous Clinical Surveillance: ICU Monitoring Outside the ICU, interview with Brian McAlpine, June 26, 2018

MCC webinar, Real-Time Situational Awareness, interview with Dr Ben Kanter, May 21, 2018

MCC webinar, The Messaging Value Pyramid, interview with Ron Remy, April 17, 2018

MCC webinar, The Inside Story on Wireless in Healthcare, interview with David Hoglund, March 28, 2018

MCC webinar, Medical Device Security: A Simple Roadmap and What to Do Right Now, interview with Caston Thomas, February 21, 2018

Healthcare Messaging Conference and Exhibition, Program Chairperson, Keynote presentation, November 29-30, 2017, Boston

Use of Middleware in Alarm Management: Ancillary Notification and Obtaining Alarm Data, webinar panelist, AAMI Foundation's Healthcare Technology Safety Institute, January 28, 2014

Safeguarding Information and Resources against Emerging Cybersecurity Threats, roundtable discussion, AAMI Horizons, spring 2014

Inaugural Clinical Alarm Safety Symposium, Program Chair and keynote, Herndon, VA, November 20-21, 2014

AAMI Foundation, National Coalition for Alarm Management Safety, Coalition Meetings, "Role of Messaging Middleware for Alarm Notification," July 29, 2014, Herndon, VA

Fifth Annual Medical Device Connectivity Conference, Program Chair and keynote, Herndon, VA, November 21-22, 2013

FDA News webinar, "Medical Device Mobile Apps The Biosense Case: FDA Sends First Warning," webinar chairperson and presented "Driving Adoption of Mobile Apps for Medical Device Connectivity and Remote Healthcare: Top Trends," October 7, 2013

Summer Institute in Nursing Informatics, Beyond Stage 7 and Meaningful Use: What's Next?, Speaker/Facilitator, "Deep Dive on Interoperability," July 19-19, 2013, Baltimore

Meru-Health IT Network webinar, "Wi-Fi and Medical Device Systems: The Balancing Act," June 28, 2013

Clinical Workflow and Technology Integration Summit, Texas Children's Hospital, "Establishing the Vision" panelist, June 7, 2013, Houston

First CIS Qatar International Conference, Clinical Information Systems Challenges and Effective Strategies, Speaker, "Importance of Enterprise Wide Medical Device Integration in CIS Workflow," April 20, 2013, Doha, Qatar

Kelley School of Business, Center for the Business of Life Sciences, The Continuing Evolution of the FDA, Panelist, "Expected Changes from the Recent FDA Safety and Innovation Act," November 16, 2012, Indianapolis

Fourth Annual Medical Device Connectivity Conference, Program Chair and keynote, November 1-2, 2012, Boston

Abbott Global Design Quality Conference, "Medical Device Development on Mobile Platforms," October 17, 2012, Chicago

UMB Wireless Connectivity in Medical Devices conference, Keynote "Mobile Apps Trends," and "Wireless Commercial Viability," July 25-26, 2012, San Jose

AMDIS Physician-Computer Connections Symposium, "Device Integration: Acute Care," June 28, 2012, Ojai

Draeger-HIMSS webinar, "Advances in Wireless Technologies for Healthcare: The Benefits of Wireless in Healthcare and Evolving Best Practices," June 27, 2012

Telehealth Alliance of Oregon, 6th Annual Meeting and Summit, Plenary Session, Integrating Mobile Technology into Telehealth Programs, "Medical Device Data Systems (MDDS): What Are They and How Are They Regulated?", February 2, 2012, Portland OR

HIMSS 2012, Clinical Engineering and IT Leadership Symposium, Closing Keynote: "Beyond the Medical Device," February 20, 2012, Venetian Sands Expo Convention Center, Las Vegas

Medical Device Alarms Summit, panelist, "Have We Gone Too Far? The Role of Secondary (Remote) Notification Systems," jointly convened by AAMI, ACCE, FDA, ECRI Institute and the Joint Commission, October 4-5, 2011, Hyatt Dulles Hotel

Third Annual Medical Device Connectivity Conference, Program Chair and keynote, September 8-9, 2011, Boston

Business Intelligence & Analytics for Healthcare, "Using Connected Devices to Improve BI for Healthcare Providers," co-presented with Shahid Shah, July 12, 2011, San Diego

Healthcare Unbound, post conference workshop, "Developing a Regulatory Strategy for Your Healthcare Unbound Product," July 12, 2011, San Diego

Amphion Forum, panelist on Context Intelligence: Smart Devices In Critical Contexts–Building Revenue & Saving Lives, June 14, 2011, Chicago

FDA's final MDDS rule and its implications for currently regulated and unregulated vendors and providers, webinar, Compliance Online, 2011

Security in eHealth, webinar, OpenSystems Media, March 16, 2011

Second Annual Medical Device Connectivity Conference, Program Chair and keynote, "Emerging Problems and Rising Awareness of Medical Device Systems on Enterprise Networks," September 28-29, 2010, San Diego

mHealth Summit, "Validation and Practical Deployment of Wireless Health," November 8-10, 2010, Washington, DC

FDA Workshop on Medical Device Interoperability, "Converged Medical Device and Enterprise Network" (presentation), January 25-27, 2010, Washington, DC

NJHIMSS/DVHIMSS Fall 2009 Conference, "Everything is Connected at the Point of Care" October 22-23, 2009, Atlantic City

Everywhere Healthcare, CTIA Wireless IT & Entertainment, "Wireless Health Regulatory Framework," October 8, 2009, San Diego

Device Forum at Cerner Health Conference, "Medical Device Connectivity," October 6, 2009, Kansas City

Inaugural Medical Device Connectivity Conference, Program Chair and keynote, "Medical Device Connectivity in Healthcare" (news story on conference), September 10-11, 2009, Boston

Healthcare Unbound, "Regulatory Issues for Healthcare Unbound," June 22-23, 2009, Seattle

World Connex ConnexAll keynote address, "Connectedness and the Point of Care," April 20-22, 2009, Lisbon

Healthcare Unbound, "The Network Effect - Impact on the Adoption of Healthcare Unbound Technologies," July 2008, San Francisco

The FDA's proposed Medical Device Data System (MDDS) rule and its implications for currently regulated and unregulated vendors and providers, webinar, Compliance Online, May 2008

AAMI Conference & Expo, "Point of Care Automation Case Study & Best Practices," June 16-18, 2007, Boston

Joint Workshop on High Confidence Medical Devices, Software, & Systems (HCMDS) and Medical Device Plug-and-Play (MD PnP) Interoperability, "View from the Blogosphere" (video), June, 2007, Boston

Healthcare Unbound, Post Conference Workshop, "Digital Homes and Smart Phones: Emerging Clinical and Business Models," July 17-18, 2006, Cambridge

## Memberships and Awards

American College of Clinical Engineering, Challenge Award, 2012

Memberships: AAMI, HIMSS