



## **Terry Munson**

President and Founder  
Foresite, Inc.

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### **Professional Experience:**

1992-Present Foresite, Inc. – Kokomo, IN  
President and Founder

- Created a battery of service offerings including failure analysis, process and material qualifications, and cleanliness assessment / validation for the printed circuit board processing industry.
- Has grown Foresite to support 21 full and part-time employees with annual sales exceeding \$5.0 million.
- Has built a worldwide clientele base of over 2500 companies including Intel, Bayer, NASA and Dell.
- Consults with a full range of electronics OEMs and subcontractors in industries including medical, automotive, computers, consumer electronics and aerospace.
- Specifically, for the printed circuit board processing industry:
  - specializes in failure analysis, identifying the root cause(s);
  - identifies any manufacturing process sources of the problem;
  - recommends corrective actions to optimize the process, eliminate the root cause, and evaluate/reclaim non-conforming inventory;
  - qualifies the revised process and establishes process monitoring parameters to avoid future issues.
- Primary author of the IPC test method for ion chromatography.
- Developed and patented the C3 tester for localized residue assessment (US patent # 5,783,938 7/98, UK patent # 2324374, China patent # ZL98107079.5, Hong Kong patent # 1018313, Germany patent # 19807580.4).
- Foresite is ISO 9001:2015 Certified.

1988-1992 Delco Electronics (Now Delphi Electronics) – Kokomo, IN  
Director, Corrosion Studies Laboratory

- Developed ion chromatography applications for the electronics and wafer fabrication industries.
- Was a critical member of a team that eliminated the use of 22 million pounds of CFC materials per year and saved \$29 million.



- Worked as a critical team member of the Q1000 cleanliness supplier specification.
- Implemented cleanliness standards training courses for all divisions of Delco Electronics.
- Assessed residue levels and their effect on electronic product performance in all manufacturing areas, including wafer fab, water-soluble hybrids, and engine control modules.

1985-1988 Duke Memorial Hospital – Peru, IN  
Lab Technician

- Worked in autopsy investigations.
- Supported the hospital wards and emergency room for all analytical lab and blood banking needs.

1980-1984 U.S. Air Force  
Military Specialist

- Worked as a medical lab technician & EMT.
- Also trained in chemical weapons detection, field operations for disaster recovery and pilot reconnaissance.

## Training

1989-Present IPC Trade Association

- Obtained IPC 610 inspector and instructor certification
- Attended all advanced ESD courses
- Participant in solvent replacement manufacturing technology research and educational offerings

1989-1990 Delco Electronics (Now Delphi Electronics)

- Attended Delco Electronics Engineering courses I, II, and III in statistical analysis
- Part of FMEA failure analysis research group

1980-1984 U.S. Military – Air Force Reserves and Active Duty

- Trained and certified as a medical lab technician
- Trained in chemical weapons detection
- Trained in field operations for disaster recovery
- Certified EMT
- Trained in pilot reconnaissance



## Teaching Experience

- Certified IPC 610 instructor trainer
- Trained employees and management of client companies in proper cleanliness parameters for electronics manufacturing
- Hosted the IPC No-Clean Conference in Minneapolis, MN in 1995

## Conference Presentations

- SMTA Pan Pacific Microelectronics Symposium – 2019 – Presentation on “Cleanliness Requirements a Moving Target”
- SMTA Pan Pacific Microelectronics Symposium – 2018 – Presentation on “Evaluation of No-Clean Flux Residues Remaining After Secondary Process Operations”
- SMTA Pan Pacific Microelectronics Symposium – 2017 – Presentation on “Comparison of Ionic Test Methods to Determine Their Ability to Reliably Predict Performance Risks”
- SMTA Pan Pacific Microelectronics Symposium – 2016 – Presentation on “What Makes No-Clean Flux Residue Benign”
- SMTA Pan Pacific Microelectronics Symposium – 2015 – Presentation on Field Returns of Electronic Hardware – No Trouble Found (NTF) Returns Why”
- Contributor and frequent presenter at the airline industry PERM (Pb-free Electronics Risk Mitigation) consortium sessions
- SMTA Harsh Environment conference 2006, 2007 and in 2008 on flux entrapment below low stand off components (QFN in detail)
- First Tin Whisker Conference at CALCE 2008 on “SAC305 producing whiskers”
- IPC APEX Conference – 2004 – Poster presentation on “C3 Localized Cleanliness Tester and Localized Extraction Methods for Usage with Ion Chromatography”
- International Ion Chromatography Symposium (IICS) – 2003 – Poster presentation on “C3 Localized Cleanliness Tester Extraction Techniques”
- International Ion Chromatography Symposium (IICS) – 2003 – Presentation on “Applying Ion Chromatography in the Electronics Industry”
- Presented 3 years in a row at the Nepcon International Conference in the mid-nineties

## Grants & Research Projects

- 2013 – Missile Defense Agency, DoD (MDA) SBIR Phase I – “Complex Electronic Assembly Cleanliness” – develop ionic cleanliness standards for high performance electronics.
- 2013 - MDA STTR Phase II – “Development of a Qualification Plan for All Lead-Free Manufacturing Processes for BMDS Interceptor Product Lines”
- 2012 – ManTech/Y-12 (Oak Ridge, TN) STTR – “Improved Performance of Lead-free Soldered and Plated Circuit Board IC Components Through the Control of Grain Structure as a Means of Tin Whisker Mitigation”



- 2010 – STTR Phase II on Tin Whisker – “Tin Whisker Mitigation Technologies for Sn-based Surface Finishes on Electronic Assemblies and Microelectronic Devices” Contract # HQ0006-10-C-7204 Agency: Missile Defense Agency (MDA)
- 2009 – STTR Phase I on Tin Whisker – “Development and Validation of Tin-Whisker Growth Model and Accelerated Testing” Proposal # O083-M04-2001 Agency: OSD/Army topic
- 2004 – KTC (Kokomo Technology Center) – Helped in the development of a non-profit center for high technology companies to perform industry forwarding research
- 1999 – 21<sup>st</sup> Century Funding Grant - Joint undertaking with Rose-Hulman University (Rose-Hulman Ventures) – Project helped to fund the development of the C3 Localized Cleanliness Tester
- 1998-1999 – Designed Umpire Board Test Vehicle as a substrate by which to qualify electronics manufacturing processes using SIR testing methodologies
- 1997 – Navy SBIR funding - Studied development of selective conformal coating removal processes
- 1996 – ARPA Funding - Joint project with Georgia Tech University and U.S. military – Study to prove long term reliability of water-soluble fluxes in military hardware
- 1996 – EPA Funding - Follow up to Low Residues Solvent Task Force project – CCAMTF study to determine alternative surface finishes for bare boards
- 1994 – DARPA Funding (division of DOD) – Funding for Low Residues Solvent Task Force: Project enacted to prove that no-clean fluxing technologies could be used for military class 3 hardware specifications
- 1993 – Army SBIR Funding - Worked on development of Sequential Electrochemical Reduction Analysis (SERA)
- 1988 – Developed and Authored IPC TM 650-2.3.28 for Identifying and Quantifying Process Residues Utilizing Ion Chromatography

### **Bibliography of Industry Publications**

- Has published over 150 industry relevant articles since Foresite’s inception
- 2004 – *Circuitnet* – wrote monthly column entitled “Residues.com” – some highlighted columns include:
  - October 2004 – “Field Performance Problems”
  - September 2004 – “Failure of a Circuit”
- 2001 – *Cleanliness Symposium* – “Correlating Ion Chromatography Results with Electrical Performance Testing”
- 2000 – *Future Circuits International* - “The Failure of a Circuit: Reliability Effects of Process Residues”
- 1996 – *Circuits Assembly* – wrote monthly column entitled “Process Rx” – some highlighted columns include:
  - Nov 08 thru Feb 09 A four-part article on “Comparative Test Methods looking at process residues”
  - July 2004 – “Is this White Residue a Reliability Risk?”
  - May 2001 – “Incoming Components as a Source of Contamination”



- June 2001 – “Cleanliness Specifications”
- March 1997 – “The Crystalline Entity”
- May 1997 – “Talk About Being Canned”
- June 1997 – “But I’m Wearing Finger Cots!”
- February 1997 - “Leakage, Leakage, Leakage”
- September 1996 – “Garbage In = Garbage Out”

### **Professional Memberships & Offices Held**

- INEMI member since 2017 and active member
- NACE member since 2010 and active member
- PERM member since 2009 and active member
- ASTM member since 2006 and active member
- SMTA member since 2002 and active member
- Member of Instruments Systems Association (ISA) since 2001
- Has been a member of the IPC Association Connecting the Electronics Industry since 1988
  - Recent chairman of the Rework Cleaning Task Group for IPC
  - Has held chairman or co-chairman leadership roles in 7 other task groups
  - Is a member of 17 other IPC task groups

### **Awards**

- 2008 SMT Magazine’s Vision Award for Test Equipment - C3® Critical Cleanliness Control
- 2003 – Distinguished Committee Service Award for Participation in IPC SIR Round Robin Test Program – Awarded by IPC Association Connecting Electronics Industry
- 2002 – Distinguished Committee Service Award for Significant Effort in the Release of IPC-TR-583 – Awarded by IPC Association Connecting Electronics Industry
- 2001 – IPC President’s Award for Contributions to the Advancement of the Electronics Industry
- 2000 – Distinguished Committee Service Award for Participation in Drafts of Standards and Test Methods – Awarded by IPC Association Connecting Electronics Industry
- 1998 – US Patent 5,783,938 – Patent awarded for Method and Apparatus for the quantitative measurement of the corrosive effect of residues present on the surface of electronic circuit assemblies
- 1997 – Indiana Electronics Manufacturing Association’s Certificate of Appreciation for Presentation at the 1997 IEMA Electronics Technology Conference
- 1996 – EPA Stratospheric Ozone Protection Award to the Low Residues Soldering Task Force in Recognition of Exceptional Contributions to Global Environmental Protection
- 1996 – Growth 100 Award – Awarded by Indiana University School of Business’s Center for Entrepreneurship and Innovation (CEI)
- 1995 – Sandia National Laboratory’s President’s Quality Award
- 1995 – 19<sup>th</sup> Annual Electronics Manufacturing Seminar – Advancing Technology Award