

# **Silicon Wafer NA TC Chapter Liaison Report**

# Meeting Information

- **Last meeting**

- Tuesday, July 14, 2015, SEMICON West
  - San Francisco Marriott Marquis, CA

- **Next meeting**

- No TC Chapter meeting at NA Fall meeting
- Tuesday, April 5, 2016, NA Spring
  - KLA Tencor, Milpitas, CA
  - Check [www.semi.org/standards](http://www.semi.org/standards) for the latest schedule update

# NA Silicon Wafer TC Chapter

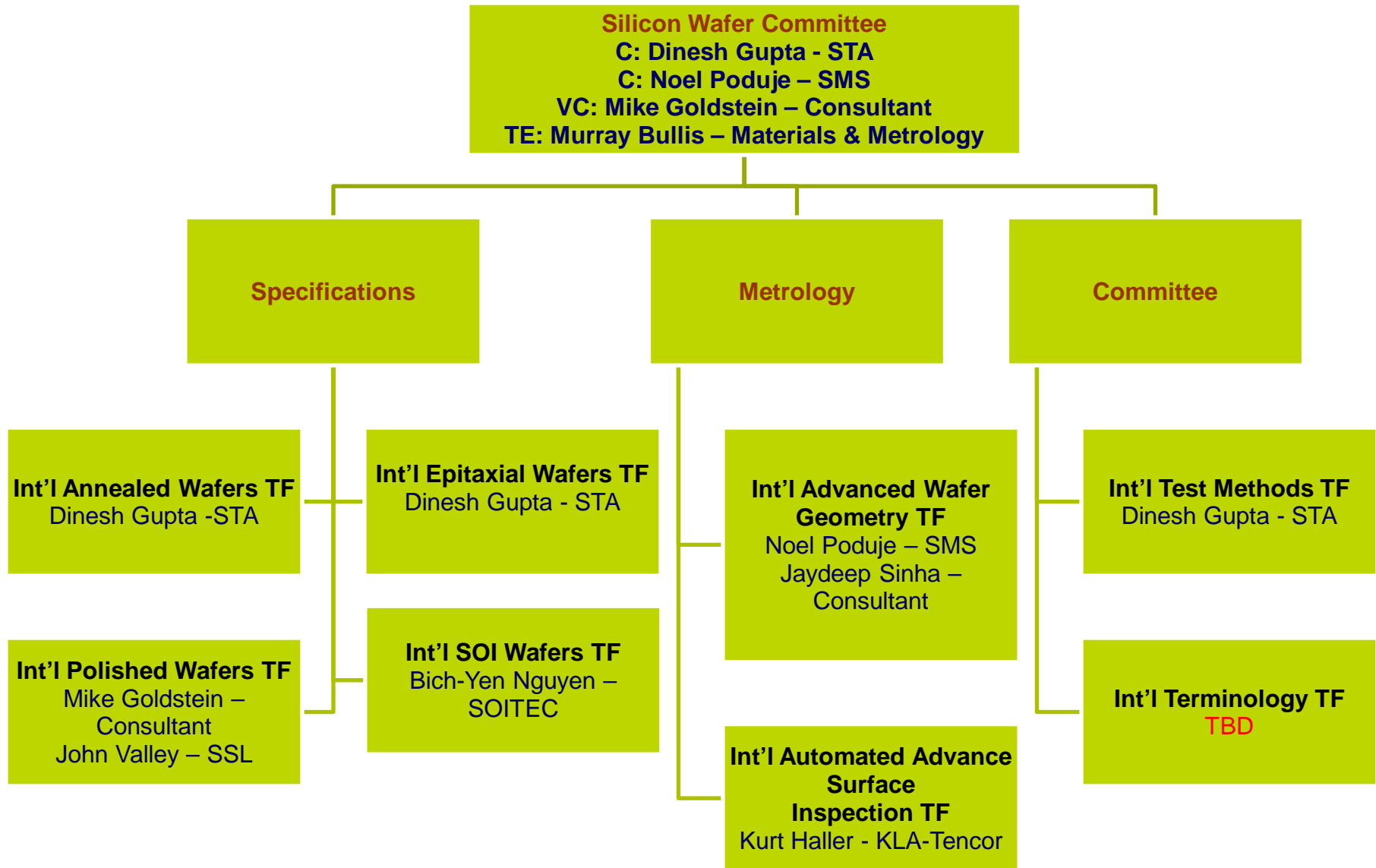
## Committee Chairmen



Dinesh Gupta /STA



Noel Poduje /SMS



# Ballot result [1/4]

## (Ballot Passed)

- Doc. 5313C, Revision of SEMI MF1535-0707 With Title Change To: Test Method for Carrier Recombination Lifetime in Electronic-Grade Silicon Wafers by Non-Contact Measurement of Photoconductivity Decay by Microwave Reflectance
- Doc. 5746, Line Item Revision of SEMI ME1392-1109, Guide for Angle Resolved Optical Scatter Measurements on Specular or Diffuse Surfaces
- Doc. 5655, Line Item Revision to SEMI M1-0215, Specifications for Polished Single Crystal Silicon Wafers (EE Reduction)
- Doc. 5705, Revision of SEMI M67-1109 With Title Change To: Test Method for Determining Wafer Near-Edge Geometry from a Measured Thickness Data Array Using the ESFQR, ESFQD, and ESBIR Metrics
- Doc. 5706, Revision of SEMI M70-1109 With Title Change To: Test Method for Determining Wafer-Near-Edge Geometry Using Partial Wafer Site Flatness
- Doc. 5806, Revision of SEMI M68-0315 With Title Change To: Test Method for Determining Wafer Near-Edge Geometry from a Measured Height Thickness Data Array Using a Curvature Metric, ZDD
- Doc. 5807, Revision of SEMI M77 -1110 With Title Change To: Test Method for Determining Wafer Near-Edge Geometry Using Roll-Off Amount, ROA

# Ballot result [2/4]

## (Ballot Passed)

- Doc. 5805, Revision of SEMI M50-0310, Test Method for Determining Capture Rate and False Count Rate for Surface Scanning Inspection Systems by the Overlay Method
- Doc. 5845, Reapproval of SEMI M16-1110 - Specification for Polycrystalline Silicon
- Doc. 5846, Reapproval of SEMI M17-1110 - Guide for a Universal Wafer Grid
- Doc. 5847, Reapproval of SEMI M66-1110 Test Method to Extract Effective Work Function in Oxide and High-K Gate Stacks Using the MIS Flat Band Voltage-Insulator Thickness Technique
- Doc. 5848, Reapproval of SEMI MF1153-1110 - Test Method for Characterization of Metal-Oxide Silicon (MOS) Structures by Capacitance-Voltage Measurements
- Doc. 5849, Line Item Revision of SEMI MF1389-1110 - Test Methods for Photoluminescence Analysis of Single Crystal Silicon for III-V Impurities
- Doc. 5850, Reapproval of SEMI MF1529-1110 - Test Method for Sheet Resistance Uniformity Evaluation by In-Line Four-Point Probe with the Dual-Configuration Procedure

# Ballot result [3/4]

## (Ballot Passed)

- Doc. 5851, Reapproval of SEMI MF1618-1110 - Practice for Determination of Uniformity of Thin Films on Silicon Wafers
- Doc. 5852, Reapproval of SEMI MF1725-1110 - Practice for Analysis of Crystallographic Perfection of Silicon Ingots
- Doc. 5853, Reapproval of SEMI MF1726-1110 - Practice for Analysis of Crystallographic Perfection of Silicon Wafers
- Doc. 5854, Reapproval of SEMI MF1727-1110 - Practice for Detection of Oxidation Induced Defects in Polished Silicon Wafers
- Doc. 5856, Reapproval of SEMI MF1809-1110 - Guide for Selection and Use of Etching Solutions to Delineate Structural Defects in Silicon
- Doc. 5857, Withdrawal of SEMI MF2166-1110 - Practices for Monitoring Non-Contact Dielectric Characterization Systems Through Use of Special Reference Wafers
- Doc. 5858, Reapproval of SEMI MF1810-1110 - Test Method for Counting Preferentially Etched or Decorated Surface Defects in Silicon Wafers

## Ballot result [4/4] (Ballot Failed)

- Doc. 5744, Line Item Revision to SEMI M49-1014, Guide for Specifying Geometry Measurement Systems for Silicon Wafers for the 130 nm to 16 nm Technology Generations
- Doc. 5855, Reapproval of SEMI MF1771-1110 Test Method for Evaluating Gate Oxide Integrity by Voltage Ramp Technique



# TFOF Changes

- **Int'l 450 mm Wafer TF**
  - Disbanded
- **Int'l Polished Wafer TF**
  - New co-leader
    - John Valley - SunEdison Semiconductor Limited
  - New co-leader
    - Michael Goldstein - Consultant

# Abandoned SNARFs [1]

- **Int'l 450 mm Wafer TF**

- Doc. 5070, Revision to SEMI M76-0710, Specification for Developmental 450 mm Diameter Polished Single Crystal Silicon Wafers
- Doc. 5071, Revision to M76, Specification for developmental 450 mm diameter polished single crystal silicon wafers
- Doc. 5794, New Standard: Specification Of Developmental 450mm Diameter Polished Single Crystal Notchless Silicon Wafers With Back Surface Fiducial Mark

# Standards voted to be inactive

- SEMI M76-0710, Specification for Developmental 450 mm Diameter Polished Single Crystal Silicon Wafers

# New SNARFs [1]

- **Int'l Test Methods TF**

- **Reapprovals/line item revisions**

- SEMI MF42-1105 (Reapproved 0611) Test Methods for Conductivity Type of Extrinsic Semiconducting Materials
    - SEMI MF43-0705 (Reapproved 0611) Test Methods for Resistivity of Semiconductor Materials
    - SEMI MF81-1105 (Reapproved 0611) Test Method for Measuring Radial Resistivity Variation on Silicon Wafers
    - SEMI MF154-1105 (Reapproved 0611) Guide for Identification of Structures and Contaminants Seen on Specular Silicon Surfaces
    - SEMI MF674-0705 (Reapproved 0611) Practice for Preparing Silicon for Spreading Resistance Measurements
    - SEMI MF847-0705 (Reapproved 0611) Test Method for Measuring Crystallographic Orientation of Flats on Single Crystal Silicon Wafers by X-Ray Techniques
    - SEMI MF951-0305 (Reapproved 0211) Test Method for Determination of Radial Interstitial Oxygen Variation in Silicon Wafers
    - SEMI MF1152-0305 (Reapproved 0211) Test Methods for Dimensions of Notches on Silicon Wafers
    - SEMI MF1239-0305 (Reapproved 0211) Test Method for Oxygen Precipitation Characteristics of Silicon Wafers by Measurement of Interstitial Oxygen Reduction
    - SEMI MF2139-1103 (Reapproved 1110) Test Method for Measuring Nitrogen Concentration in Silicon Substrates by Secondary Ion Mass Spectrometry
    - SEMI MF1617-0304 (Reapproved 0710) Test Method for Measuring Surface Sodium, Aluminum, Potassium, and Iron on Silicon and EPI Substrates by Secondary Ion Mass Spectrometry
    - SEMI MF533-0310 Test Method for Thickness and Thickness Variation of Silicon Wafers

## New SNARFs [2]

- **Int'l Annealed Wafer TF**

- Doc. 5910, Line Item Revision of SEMI M57-0515, Specifications for Silicon Annealed Wafers

- **Int'l Epi Wafer TF**

- Doc. 5911, Line Item Revision of SEMI M62-0515, Specifications for Silicon Epitaxial Wafers

## New SNARFs [3]

- **Int'l Polished Wafer TF**

- Doc. 5893, Revision of SEMI M1-0915 Specifications for Polished Single Crystal Silicon Wafers

- **Int'l AWG TF**

- Doc. 5915, Line Item Revision to SEMI M1-0915 Specifications for Polished Single Crystal Silicon Wafers (Re: illustration of Geometry Parameters)

# Ballots approved for next meetings [1/3]

- **Cycle 6-2015**

- Doc. 5737, Revision of SEMI MF1391-1107 (Reapproved 0912), Test Method for Substitutional Atomic Carbon Content of Silicon by Infrared Absorption
- Doc. 5804, Revision of SEMI M53-0310, Practice for Calibrating Scanning Surface Inspection Systems Using Certified Depositions of Monodisperse Reference Spheres on Unpatterned Semiconductor Wafer Surfaces
- Doc. 5859, Line Item Revision of SEMI MF1811-0310, Guide for Estimating the Power Spectral Density Function and Related Finish Parameters from Surface Profile Data

# Ballots approved for next meetings [2/3]

- **Cycle 7-2015**

- Doc. 5855A, Line Item Revision of SEMI MF1771-1110 Test Method for Evaluating Gate Oxide Integrity by Voltage Ramp Technique
- Doc. 5910, Line Item Revision of SEMI M57-0515, Specifications for Silicon Annealed Wafers
- *Reapprovals/line item revisions*
  - *SEMI MF42-1105 (Reapproved 0611) Test Methods for Conductivity Type of Extrinsic Semiconducting Materials*
  - *SEMI MF43-0705 (Reapproved 0611) Test Methods for Resistivity of Semiconductor Materials*
  - *SEMI MF81-1105 (Reapproved 0611) Test Method for Measuring Radial Resistivity Variation on Silicon Wafers*



# Ballots approved for next meetings [3/3]

- **Cycle 7-2015 - Reapprovals/line item revisions**

- SEMI MF154-1105 (Reapproved 0611) Guide for Identification of Structures and Contaminants Seen on Specular Silicon Surfaces
- SEMI MF674-0705 (Reapproved 0611) Practice for Preparing Silicon for Spreading Resistance Measurements
- SEMI MF847-0705 (Reapproved 0611) Test Method for Measuring Crystallographic Orientation of Flats on Single Crystal Silicon Wafers by X-Ray Techniques
- SEMI MF951-0305 (Reapproved 0211) Test Method for Determination of Radial Interstitial Oxygen Variation in Silicon Wafers
- SEMI MF1152-0305 (Reapproved 0211) Test Methods for Dimensions of Notches on Silicon Wafers
- SEMI MF1239-0305 (Reapproved 0211) Test Method for Oxygen Precipitation Characteristics of Silicon Wafers by Measurement of Interstitial Oxygen Reduction
- SEMI MF2139-1103 (Reapproved 1110) Test Method for Measuring Nitrogen Concentration in Silicon Substrates by Secondary Ion Mass Spectrometry
- SEMI MF1617-0304 (Reapproved 0710) Test Method for Measuring Surface Sodium, Aluminum, Potassium, and Iron on Silicon and EPI Substrates by Secondary Ion Mass Spectrometry
- SEMI MF533-0310 Test Method for Thickness and Thickness Variation of Silicon Wafers

# Int'l Advanced Wafer Geometry TF

- **Leaders:**
  - Noel Poduje (SMS) & Jaydeep Sinha (Consultant)
- **Presentation:**
  - John Valley of SunEdison presented “Proposed Approach to Nanotopography for Lithography (Litho-NT).
  - Oleg Gluschenkov of IBM presented “Role of Backside Wafer Geometry in Advanced Process Control”.
- **Ballot development**
  - M49 (exclusion window) revision by Japan
  - M1 ( geometry parameters) revision by Japan

# Int'l Annealed Wafer TF

- **Leader:**
  - Dinesh Gupta (STA)
  - **Doc. 5910, Line Item Revision SEMI M57-0414 Specifications for Silicon Annealed Wafers**
    - To correct title from “Specifications” to “Specification”
    - For title conformance with the Regulations

# Int'l Epitaxial Wafer TF

- **Leader:**
  - Dinesh Gupta (STA)
- **Doc. 5911, Line Item Revision of SEMI M62-0515, Specifications for Silicon Epitaxial Wafers**
  - To correct title from “Specifications” to “Specification”
  - For title conformance with the Regulations

# Int'l Automated Advanced Surface Inspection TF

- **Leader:**
  - Kurt Haller (KLA-Tencor)
- **Ballots issued for review at SEMICON Europa**
  - Doc. 5804, Revision of SEMI M53-0310 - Practice for Calibrating Scanning Surface Inspection Systems Using Certified Depositions of Monodisperse Reference Spheres on Unpatterned Semiconductor Wafer Surfaces.
  - Doc. 5859, Line Item Revision of SEMI MF1811-0310, Guide for Estimating the Power Spectral Density Function and Related Finish Parameters from Surface Profile Data
- **Presentation**
  - Joann Qiu presented a status update of an ongoing study of the implementation of model-based calibration procedures conducted by Intel, Siltronic, and KLA-Tencor.

# Int'l Polished Wafer TF

- **Leaders:**
  - John Valley - SunEdison Semiconductor
  - Michael Goldstein - Consultant
- **Drafting**
  - Doc. 5893, Revision of SEMI M1-0915 Specifications for Polished Single Crystal Silicon Wafers
    - Ballot will be issued after SEMICON Europa meeting

# Int'l SOI Wafer TF

- **Leader:**

- Bich-Yen Nguyen (SOITEC)

- **Discussions:**

- MEMS/NEMS and 3D-IC groups for collaboration and needs

- High resistivity SOI specification

- May need to revise M71-0912 - Specification for Silicon-on-Insulator (SOI) Wafers for CMOS LSI

- No progress made.

# Int'l Test Methods TF

- **Leader:**
  - Dinesh Gupta (STA)
- **Drafting**
  - Doc. 5703, New Standard: Guide for Carrier Recombination Lifetime Measurements in Electronic Grade Silicon
  - Maintaining 5 year review SEMI MF documents



# Int'l Terminology TF

- **Leader:**
  - TBD
- **No meeting was held**

# Question?

- For more information, please contact  
Kevin Nguyen at [knguyen@semi.org](mailto:knguyen@semi.org)