

QUALITY, RELIABILITY, AND COMMITMENT

PROCESS DEVELOPMENT | OPTIMIZATION | ADVANCED LITHOGRAPHY | THIN FILMS | WAFER RECLAIM

WWW.NOELTECH.COM



NOEL TECHNOLOGIES AT A GLANCE

Headquartered in the heart of Silicon Valley since 1996, NOEL delivers advanced process development and optimization design services for semiconductor, MEMS and life sciences manufacturing and OEM customers around the world. Our extensive semiconductor and biotech engineering knowledge and expertise, has helped to set us apart from our competitors. For more the 20 years, NOEL development programs have helped our customers bring their design ideas to market.

Now, through the acquisition of NOEL by Pure Wafer, we can offer the most comprehensive range of silicon solutions and services anywhere in North America, the EU and Asia-Pacific regions. Services include:

- **Extensive silicon process development and optimization**
- **Advancing to the latest biochip development**
- **Sensors, MEMS, Photonics**
- **Single & multi-layer pattern processing**
- **Setting wafer standards**
- **Comprehensive silicon wafer reclaim services**

By adding NOEL products and capabilities, we now provide the broadest range of silicon solutions and services anywhere helping to meet our customers' needs and assuring them success.

S. Mark Borowicz

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CEO, Pure Wafer & Noel Technologies

DEEP DEVELOPMENT EXPERTISE

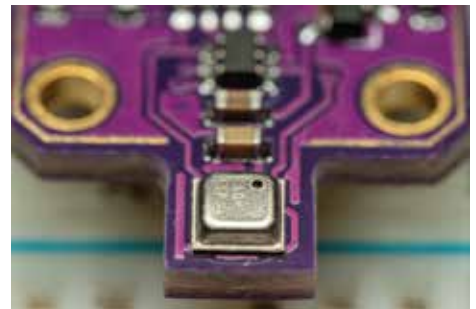
Lab to fab to production
Versatile tool sets
Broad range of materials
Collaborative approach

Dielectrics and metals
Lithography
Advanced engineering
Applications development
Semiconductors

Biotech
MEMS
Photonics

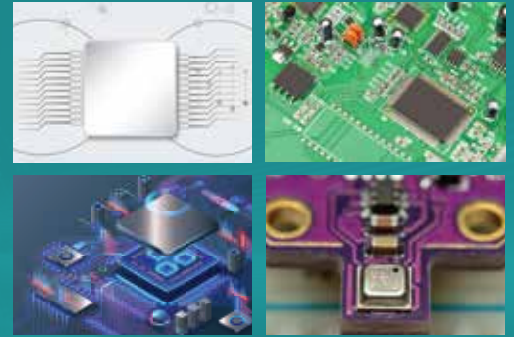
INNOVATING ADVANCES IN LIFE SCIENCES

Development, characterization and validation are critical process steps in biotechnology as they are in semiconductor manufacturing. Those same critical semiconductor materials used in chip manufacturing are equally important to developing the latest bio chips that drive new innovations in life sciences. Often though, early prototyping is a challenge as production concerns trump early-stage development programs. That's where NOEL comes in! NOEL leverages its unique range of foundry services, including a 30 + years of semiconductor and biotechnology knowledge base and expertise. We serve as a key development hub for early-stage biotech prototyping helping to bridge the gap between lab and fab.



CUSTOM DEVELOPMENT AND SERVICES

- Advanced Lithography Services
- Thin Films
- Engineering Services
- Development Work
- Wafer Recycle



CAPABILITIES

LITHOGRAPHY

Stepper

- XLS >0.5um Features
- GCA >1.0um Features
- 200mm, 150mm, 100mm

Contact Printing 1x

- 300mm >3.0um Features
- 200mm, 150mm, 100mm,
50mm >2.0um Features

Mixed Lithography

- Stepper & Contact
- Non-Standard



THIN FILMS 300MM & SMALLER

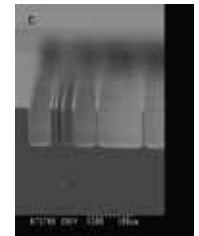
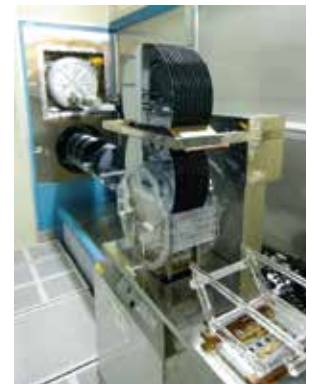
CVD Systems

Front & Back Deposition

- Thermal Oxide
- LPCVD Nitride
- LPCVD Amorphous Silicon
- LPCVD Undoped Poly Silicon

Single Wafer, Single Side Deposition

- PECVD SiO₂, Nitride
- PVD Metals: Ti, TiN, Cr,
- AlNon-Standard



PHOTORESIST

- 365nm: 1um to 20um
- 193nm: 700A to 7KA
- 248nm: 7KA to 2um
- Plating Resist 30um - 75um
- SU-8: 5um to 50um

WET CHEMISTRY ETCHES

- Silicon Etch: KOH, TMAH
- BOE 10:1, HF 10:1, HF 100:1
- Poly Silicon, ITO, ZNO, AZO
- Chrome, Ti, TiN, Al

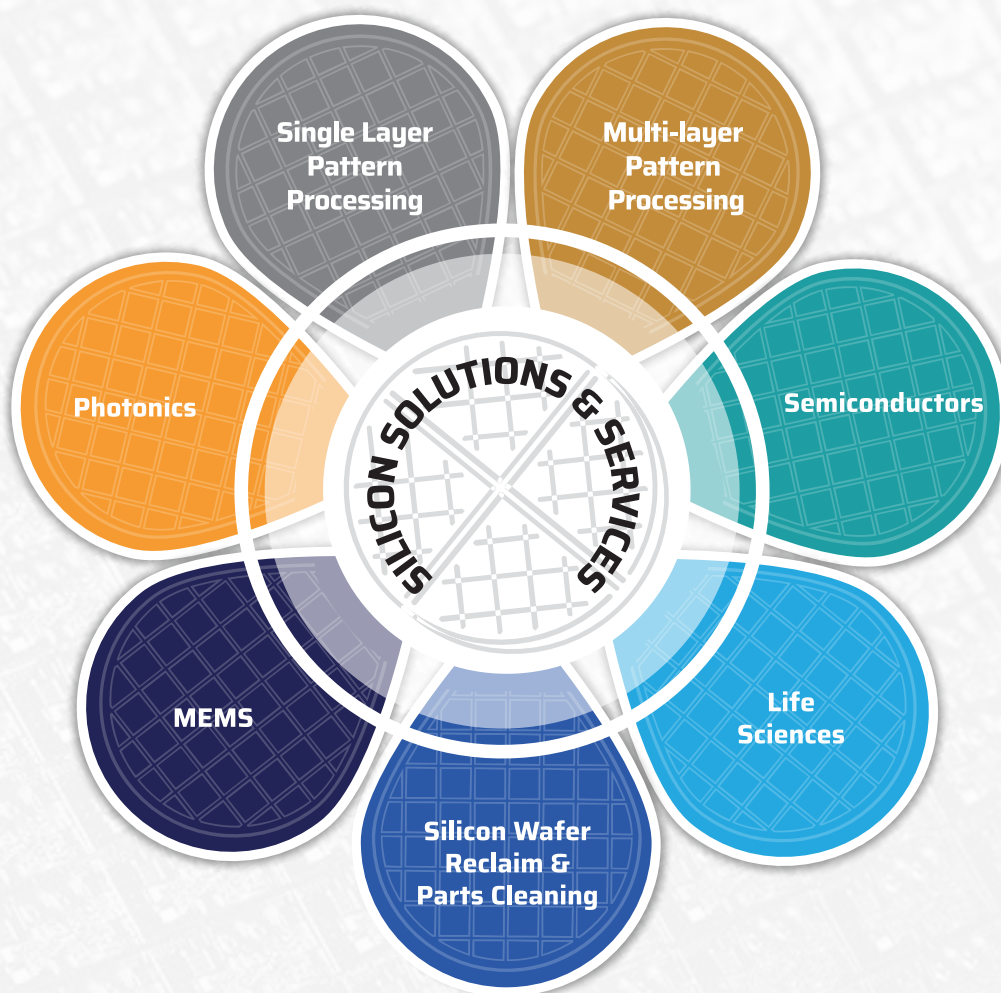
CAPABILITIES

- 50mm to 300mm Substrate Capabilities
- Top supplier of semiconductor film standards
- Full wafer device manufacturing for in-situ applications, Development to production

PLASMA ETCH

- Fluorine based chemistries including CF₄, CHF₃ & SF₆ with O₂ and/or Argon carrier gas
- Critical dimension ranging from 0.5um to 5mm
- Photoresist thickness ranges: 6,000A to 10.0um
- Post-etch photoresist removal: EKC solvent strip, O₂ plasma ash or Piranha (hot sulfuric)

COMPREHENSIVE SILICON SOLUTIONS AND SERVICES



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Contact Noel

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ISO 14001 CERTIFIED

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