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Stephen A. Jones has over 25 years of industrial processing experience employed by companies such as IBM, Advanced Micro Devices and Seagate. Mr. Jones has a B.S. in chemical engineering from **Clarkson University** and a M.S. in electrical engineering from **Columbia University**. He has worked in all aspects of manufacturing, process integration, and research. He has expertise and experience in all of the steps necessary to process **MEMS** or **NEMS** device using **Cornell's NanoScale Science and Technology Center**. For more information, please visit their website at: <http://www.cnf.cornell.edu/>.

Stephen A. Jones is the most prolific and experienced user of the CNF facility. He is trained on, and has used more than, 80 percent of all 57 tools available for users to process their samples. His unique expertise is in taking a design and realizing it in three dimensions.

He is also a trained user for the Cornell **NanoBiotechnology Center**, along with their process capabilities. For more information, please visit their website at: http://www.nbtc.cornell.edu/facilities/tool_status.htm.

Process technologies available to CNF users:

PHOTOLITHOGRAPHY

[ABM High Resolution Mask Aligner](#)

Flexible 200mm Mask Aligner with DUV light source

[Brewer CEE 6000](#)

Automatic Wafer Coating and Developing System

[EV 620 Contact Aligner](#)

Contact Lithography Exposure Tool

[GCA Autostep 200](#)

GCA Autostep 200 DSW i-line Wafer Stepper

[GCA/MANN 3600F Optical Pattern Generator](#)

Optical mask-making tool

[GCA-6300 10X i-line Stepper](#)

GCA 6300 10X i-line Stepper

[GCA-6300 5X g-line Stepper](#)

GCA 6300 DSW Projection Mask Aligner, 5X g-line Stepper

[Hamatech-Steag Mask Processors](#)

Automated Tools for Processing Photomasks

[Hamatech-Steag Wafer Processors](#)

Automated Tools for Developing Wafers

[Heidelberg DWL 66](#)

Laser Pattern Generator and Direct Writer

[HTG System III-HR Contact Aligner](#)

Flexible Contact Aligner with DUV light source

[JBA 1000 Photoresist UV Cure](#)

Tool for UV Curing of photoresist

[Karl Suss RC-8](#)

SussTec GYRSET wafer spin tool

[Manual Resist Spinners](#)

Resist Spinners

[Resist Hot Strip Bath](#)

Heated solvent for photoresist stripping

[YES LP-III Vapor Prime Oven](#)

Vacuum oven for HMDS wafer priming

[YES Polyimide Bake Oven](#)

Oven for curing polyimide and other polymer films

[YES-58SM Image Reversal Oven](#)

Photoresist image reversal oven

FURNACE PROCESSING

[Anneal 1 Furnace, Bank A tube 1](#)

MRL Industries Furnace for nitrogen anneals or oxidation of nonelectronic substrates

[Anneal 2 Furnace, Bank B tube 1](#)

MRL Industries Furnace for annealing silicon compatible substrates

[Anneal 3 Furnace, Bank C tube 1](#)

MRL Industries Furnace for annealing of silicon based materials with approved metals

[Anneal 4 Furnace, Bank C tube 2](#)

MRL Industries Furnace for annealing silicon wafers with a limited set of metals

[LPCVD Low Temperature Oxide, Bank B tube 3](#)

MRL Industries Furnace for low temperature oxide deposition on silicon based substrates

[LPCVD Polysilicon Furnace, Bank C tube 4](#)

MRL Industries Furnace for deposition of polysilicon on silicon substrates

[LPCVD Silicon Nitride, Bank B tube 4](#)

MRL Industries Furnace for silicon nitride deposition on silicon based substrates

[MOS Clean](#)

Wet Deck for SC-1, SC-2 cleaning of wafers

[TFT Low Temperature Oxide/LTO 410, Bank A tube 3](#)

MRL Industries Furnace for low temperature oxide depositions on TFT compatible substrates

[TFT N+/P+ Polysilicon Furnace, Bank A tube 4](#)

MRL Industries Furnace for polysilicon deposition on TFT compatible substrates

[TFT Oxide Furnace, Bank A tube 2](#)

MRL Industries Furnace for thermal oxidation of TFT compatible substrates

[Thermal Oxidation Furnace, Bank B tube 2](#)

MRL Industries Furnace for oxidation of silicon substrates

ELECTRON-BEAM LITHOGRAPHY

[Electron beam Resist Spinners](#)

Manual Resist Spinners for coating substrates with electron beam resist.

[JEOL 9300](#)

JEOL Ebeam Lithography: JBX-9300FS Electron Beam Lithography System

[Leica VB6-HR E-Beam Lithography System](#)

100 kV High Resolution e-Beam Lithography System

METROLOGY

[Alpha Step 200](#)

AlphaStep 200 surface profiler

[CDE Resistivity Mapper](#)

Automatic 4 point probe resistivity mapper

[FilMetrics Film Measurement Systems](#)

F20 / F40 / F50 Optical Measurement Systems for transparent thin film measurement

[Flexus Stress Measurement](#)

Noncontact tool for measuring film stress.

[Leitz MVSP](#)

Leitz Film Thickness Measurement System

[Rudolph AutoEL IV Ellipsometers](#)

Transparent Thin Film Measurement tool

[Tencor P10 Profilometer](#)

Equipment for measuring surface topology in the micron or finer scales.

[VCA Optima XE](#)

Contact Angle Measurement Tool

[Woollam Variable Angle Spectroscopic Ellipsometer](#)

Ellipsometer for full optical characterization of thin films

[WYKO HD-3300 Optical Profilometer](#)

PACKAGING

[K&S 7100 Dicing Saw](#)

[Wire Bonder](#)

Westbond 7400A Ultrasonic Wire Bonder

SEMS / MICROSCOPES

[Digital Instruments Dimension 3100 Atomic Force Microscope](#)

Atomic force microscope for high resolution profilometry

[FEI 611 Focused Ion Beam System](#)

Tool for imaging and device modification

[Nikon Microscope Cameras](#)

Digital cameras on microscopes with stand-alone controllers

[Olympus Confocal Microscope](#)

Olympus BX60/U-CFU Real Time Confocal Microscope

[Optical Inspection Microscopes](#)

Microscopes for inspection of devices

[SEM Sample Prep Sputtering System](#)

Small chamber sputtering systems for coating SEM samples

[Zeiss Supra 55VP SEM](#)

Scanning Electron Microscope

[Zeiss Ultra SEM](#)

Ultra High Resolution Field Emission SEM

THIN FILM ETCHING

[Acid Etching Tanks](#)

Tanks for hot Phosphoric acid and Nanostrip etching of wafers

[Branson/IPC P2000 Barrel Etcher](#)

Oxygen plasma asher for Photoresist/organic removal

[GaSonic Aura 1000 Asher](#)

Downstream asher for dry stripping of photoresist

[Glen 1000p Plasma Cleaning System](#)

Oxygen Plasma tool for removal of organics

[Hamatech Wafer Processor](#)

Automatic Wafer Processor for SC-1 & Piranha cleans

[Oxford PlasmaLab 100 RIE System](#)

Fluorine based ICP system for deep SiO₂/glass etching

[Oxford PlasmaLab 80+ RIE System 1](#)

Fluorine based system for etching oxide, nitride, & silicon

[Oxford PlasmaLab 80+ RIE System 2](#)

Fluorine based system for etching oxide, nitride, & silicon with endpoint detection

[PlasmaTherm 72](#)

Fluorine based Reactive Ion Etcher

[PlasmaTherm 770](#)

Two chamber inductively coupled plasma etching system for plasma etching using Chlorine or Fluorine

[PlasmaTherm720/740](#)

Chlorine-based RIE system for Silicon & Aluminum etching

[Trion Etcher](#)

Cr RIE system

[Unaxis 770](#)

Bosch Etcher for deep silicon etching

[Veeco Ion Mill](#)

Ion milling system for physical sputter etching of substrates

[Xenon Difluoride Etcher](#)

Xactix XeF₂ Isotropic silicon etch system

THIN FILM DEPOSITION

[ALD](#)

Atomic Layer Deposition

[CHA Thermal Evaporator](#)

3 Hearth Thermal Evaporator for Metal Films

[CVC 4500 Evaporator - Even Hour](#)

CVC SC4500 E-gun Evaporation System for deposition of thin films

[CVC 4500 Evaporator - Odd Hour](#)

CVC SC4500 Combination Thermal/ E-gun Evaporation System for deposition of thin films

[CVC Sputter Dep System](#)

Magnetron Sputter system for depositing thin metal & dielectric films

[Electroplating Tanks](#)

Equipment for electroplating various metals

[GSI PECVD](#)

GSI Plasma Enhanced Chemical Vapor Deposition System

[IPE 1000 PECVD](#)

IPE 1000 Plasma Enhanced Chemical Vapor Deposition System

[Parylene Deposition System](#)

Tool for depositing conformal parylene films

THIN FILM MISC PROCESSING

[AG 8108 Rapid Thermal Processer](#)

8108

[Chemical Mechanical Polishing](#)

Strasbaugh 6EC Chemical Mechanical Polishing Tool

[Critical Point Dryer](#)

Equipment for critical point drying of MEMS structures to avoid stiction

[Dimatix Printer](#)

Tool for printing a variety of materials onto substrates.

[Eaton NV-6200AV Ion Implanter](#)

Ion Implanter

[EV 501 Wafer Bonder](#)

Equipment for anodic, direct and eutectic bonding of wafers

[Hamatech Post CMP Brushcleaner](#)

Wafer processor for cleaning wafers after CMP

[MVD 100](#)

Molecular Vapor Deposition Tool for Surface Modification

[Rapid Thermal Annealer](#)
AG Associates Model 610

FACILITIES

[Chemical Hoods](#)

Acid / Base Fume Hoods for General Wet Chemistry Steps

[Toxic Gas System](#)

Gas cabinets and detector system for toxic and corrosive gases