

# Technical Program Schedule

Time	September 25 (Sun.)	Place
17:00-18:00	Register	Shangri-La Hotel 3F
18:00-20:30	Welcoming Party	Shangri-La Hotel 3F

Time	September 26 (Mon.)	Place
08:30-09:00	Register	Shangri-La Hotel 9F
09:00-09:20	Opening Speech (Chair: Wen-His Lee)	Shangri-La Hotel 9F
09:20-10:00	(Chair: Michael Current) <b>Keynote (1)</b> Chenming Hu, UC Berkeley. Will semiconductor scaling end? What then?	Shangri-La Hotel 9F
10:00-10:40	Coffee Break	
10:40-11:20	<b>Keynote (2)</b> Tri-Rung Yew, UMC. Semiconductor Industry Technology Trend and Challenges	Shangri-La Hotel 9F
11:20-12:00	<b>Keynote (3)</b> Dick James, Chipworks. Moore's Law Continues into the 1x-nm Era.	
12:00-13:30	Lunch	Shangri-La Hotel 3F
CMOS Devices & Process		
13:30-14:00	(Chair: Wen-Kuan Yeh) <b>Invite (1)</b> Sueng Woo Jin, SK hynix. Implant and Anneal Technologies for Memory and CMOS Devices.	Shangri-La Hotel 9F
14:00-15:00	<b>Oral (1)</b> Shu Qin, Micron Technology. Challenges and Solutions of Doping Process and Doping Profiling Metrology on 2-D (3-D) Devices.	
	<b>Oral (2)</b> Ming-Yi Shen, Adarsh Basavalingappa, Stock Chang, Takeshi Hayakawa, Hidekazu Matsugi and Christopher Borst, SUNY Polytechnic Institute. Effect of Ion Flux in Source-drain Extension Ion Implantation for 10-nm Node FinFET and Beyond on 300/450mm Platforms.	
	<b>Oral (3)</b> Jeng-Hwa Liao, Macronix International Co. Investigation of Floating Gate Implantation Effect on 1X NAND FLASH.	
15:00-15:20	Coffee Break	
15:20-16:20	(Chair: Jong-Shing Bow )	Shangri-La Hotel 9F

	<p><b>Invite (2)</b></p> <p><b>Werner Schustereder</b>, Infineon.</p> <p>Power Device Implants</p> <p><b>Invite (3)</b></p> <p><b>Nobukazu Teranishi</b>, Univ. of Hyogo / Shizuoka Univ..</p> <p>Ion Implantation Technology for Image Sensors</p>	
16:20-17:00	<p><b>Oral (4)</b></p> <p><b>Yi-Ju Chen, Yun-Jie Wei, Yao-Ming Huang, Min-Chuan Hsiao, Yen-Chang Chen, Hsin-Yi Peng, Chang-Hsien Lin, Kai-Shin Li, Yao-Jen Lee and Min-Cheng Chen</b>, NDL.</p> <p>A Hybrid Implant Doping Technique with Plasma Immersion Ion Implant (PIII)</p> <p>Process for 10 nm Fin Cannel of 3D-FET.</p> <p><b>Oral (5)</b></p> <p><b>YS Kim</b>, Lam.</p> <p>Formation of 5nm ultra shallow junction on 3D devices structures by ion energy decoupled plasma doping.</p>	
17:00-18:00	<p><b>Invite (4)</b></p> <p><b>Yao-Jen Lee</b>, National Nano Device Laboratories.</p> <p>Novel Transistors by Damage-free Doping Method and Microwave Annealing for Sub-7nm Node</p> <p><b>Invite (5)</b></p> <p><b>Chee-Wee Liu</b>, National Taiwan Univ..</p> <p>Heavily Phosphorus-doped Si and Ge by Chemical Vapor Deposition</p>	

Time	September 27 (Tues.)	Place
08:30-09:00	Register	NCKU Cheng Kung Hall
Monolayer Dopants & Films		
09:00-10:00	<p>(Chair: Yi-Ming Lin)</p> <p><b>Invite (1)</b></p> <p><b>Justin Holmes</b>, Univ. College Cork.</p> <p>Chemical Approaches for Doping Semiconductor Nanostructures</p> <p><b>Invite (2)</b></p> <p><b>Zengfeng Di</b>, SMIT.</p> <p>Ion Beam Synthesis Of Layer-Tunable And Bandgap-tunable Graphene</p>	NCKU Cheng Kung Hall
10:00-10:20	<p><b>Oral (1)</b></p> <p><b>Noriaki Toyoda and Isao Yamada</b>, Univ. of Hyogo.</p> <p>Low temperature graphene film formation with ethane cluster ion.</p>	
10:20-10:40	Coffee Break	
Ion Processing		
10:40-12:00	(Chair: Kyoichi Suguro)	NCKU Cheng Kung

	<p><b>Oral (1)</b></p> <p><b>Hiroshi Onoda and Yoshiki Nakashima</b>, Nissin Ion. Annealing behavior of Aluminum Implanted Germanium.</p> <p><b>Oral (2)</b></p> <p><b>Jeremiah G. Chan, Jose Mario A. Diaz, Erwin P. Enriquez, Motoi Wada and Magdaleno Jr Vasquez</b>, University of the Philippines. Doping of Spray-pyrolized Graphene Films using Ar/N<sub>2</sub> Gas Discharge.</p> <p><b>Oral (3)</b></p> <p><b>Thomas P. Martin, Ethan L. Kennon, Henry L. Jr Aldridge, Kevin Jones, Christopher Hatem and Renata A. Camillo-Castillo</b>, University of Florida. Elimination of Oxidation Induced Interstitial Injection via Ge implants.</p> <p><b>Oral (4)</b></p> <p><b>Jan Kruegener, Fabian Kiefer, Yevgeniya Larionova, Michael Rienaecker, Felix Haase, Robby Peibst and Hans-Jörg Osten</b>, Leibniz Universitaet Hannover. Ion implantation for photovoltaic applications: Review and outlook for n-type silicon solar cells.</p>	Hall
12:00-13:30	Lunch	Multifunction room
Biotechnology		
13:30-14:00	<p><b>Invite (1)</b></p> <p><b>Paul Chu</b>, City Univ. of Hong Kong. Modification of Biomaterials and Biomedical Devices by Plasma Immersion Ion Implantation &amp; Deposited and Related Techniques</p>	NCKU Cheng Kung Hall
14:00-15:00	Student Award	
15:00-18:00	Poster Session 1	Multifunction room

Time	September 28 (Wed.)	Place
08:30-09:10	Take bus to Tendrum-Cultrue	Tendrum-Cultrue
Thermal Process &Tools		
09:10-09:40	<p><b>Invite (1)</b></p> <p><b>Lingyen Yeh</b>, Taiwan Semiconductor Manufacturing Co. An investigation of spike-RTA-driven non-uniformity in transistors</p>	Tendrum-Cultrue
09:40-10:20	<p><b>Oral (1)</b></p> <p><b>Pablo Acosta, Sebastien Kerdiles, Benoit Mathieu, Marc Veillerot, Riadh Kachtouli, Fulvio Mazzamuto and Claire Fenouillet-Beranger</b>, Université Grenoble Alpes. Nanosecond laser annealing for phosphorus activation in ultra-thin implanted</p>	

	<p>silicon-on-insulator substrates.</p> <p><b>Oral (2)</b></p> <p><b>Hikaru Kawarazaki, Akitsugu Ueda, Masashi Furukawa, Takayuki Aoyama, Shinichi Kato and Ippei Kobayashi, SCREEN</b></p> <p>Semiconductor Solutions.</p> <p>New Flash Lamp Annealing tool equipped with an ambient control feature suitable for high-k gate stack anneals.</p>	
10.30-11.10	<b>Drum Show</b>	Tendrum-Cultrue
11:10-11:30	<b>Coffee Break</b>	
<b>Thermal Process &amp;Tools</b>		
11:30-12:30	<p><b>Oral (3)</b></p> <p><b>Toshiyuki Tabata and Fulvio Mazzamuto, SCREEN Semiconductor Solutions.</b></p> <p>UV excimer laser annealing for next generation power electronics.</p> <p><b>Oral (4)</b></p> <p><b>Paul Timans, Thermal Process Solutions.</b></p> <p>Dopant Activation and Deactivation Phenomena During Advanced Millisecond Anneal Cycles.</p> <p><b>Oral (5)</b></p> <p><b>Mazen Frédéric, Université Grenoble Alpes.</b></p> <p>Fracture in epitaxial InP on Si for InGaAs On Insulator fabrication via Smart Cut™.</p>	Tendrum-Cultrue
12:30-	<b>Lunch</b>	On Bus
12:30-18:00	<b>Excursion</b>	
18:00-20:30	<b>Banquet Party</b>	Tendrum-Cultrue

Time	September 29 (Thurs.)	Place
08:30-09:00	<b>Register</b>	NCKU Cheng Kung Hall
<b>Ion Implant Systems</b>		
09:00-10:00	<p><b>Invite (1)</b></p> <p><b>Yutaka Inouchi, Nissin Ion Equipment.</b></p> <p>Doping process and tool for surface treatment using large-area ion beams</p> <p><b>Invite (2)</b></p> <p><b>Hiro Ito, Applied Materials.</b></p> <p>Advancement of Ion Implanters that enabled Moore's law and evolution of semiconductor devices</p>	NCKU Cheng Kung Hall
10:00-10:20	<p><b>Oral (1)</b></p> <p><b>Thomas Horsky, Sami Hahto, Tetsuro Yamamoto, Nissin Ion.</b></p> <p>Novel ion source for the production of extended ribbon beams.</p>	
10:20-10:40	<b>Coffee Break</b>	

10:40-12:00	<p><b>Oral (2)</b></p> <p><b>Nicholas White and August Westner</b>, Albion Systems. Ion Source for Large and Very Large Ribbon Ion Beam Systems.</p> <p><b>Oral (3)</b></p> <p><b>Chen-Chi Wu, Ying Cyuan Lyu, Yen Wen Chen and Ming Hsiang Kao</b>, TSMC. Ion Implant Process with New Mixture Gas (<math>B_2H_6/H_2/BF_3</math>) for Advanced Technology Node.</p> <p><b>Oral (4)</b></p> <p><b>Brian Gori</b>, AMAT. Medium Energy High Dose Ion Implanter.</p> <p><b>Oral (5)</b></p> <p><b>Haruka Sasaki</b>, SMIT. Method of Beam Energy Adjustment by Using Beam Parallelism.</p>	NCKU Cheng Kung Hall
12:00-13:30	Lunch	Multifunction room
13:30-14:00	<p><b>Invite (3)</b></p> <p><b>Ziwei Fang</b>, Taiwan Semiconductor Manufacturing Co. Plasma doping for FinFET application</p>	NCKU Cheng Kung Hall
14:00-15:00	<p><b>Oral (6)</b></p> <p><b>Ryo Hirose, Ryosuke Okuyama, Takeshi Kadono, Ayumi Onaka-Masada, Yoshihiro Koga, Hidehiko Okuda, Kazunari Kurita and Naoki Miyamoto</b>, Sumco Corporation. Characteristics of Carbon Cluster Ion Implanted Epitaxial Silicon Wafers - Development study of multi-element molecular ion implantation technique -.</p> <p><b>Oral (7)</b></p> <p><b>Tomokazu Nagao, Taro Hayakawa, Genki Takahashi, Yutaka Inouti and Junichi Tatemichi</b>, Nissin Ion. Development of Plasma Flood Gun for Gen 5.5 Implanter.</p> <p><b>Oral (8)</b></p> <p><b>Yusuke Kuwata</b>, Nissin Ion. High Current Ion Implanter "LUXION".</p>	
15:00-18:00	Poster Session 2	Multifunction room

Time	September 30 (Fri.)	Place
08:30-09:00	Register	NCKU Cheng Kung Hall
nm-devices & films		
09:00-09:40	<p><b>Keynote (4)</b></p> <p><b>Seiji Samukawa</b>, Tohoku University.</p>	NCKU Cheng Kung Hall

	Neutral Beam Technology–Defect-free Nanofabrication for Novel Nano-materials and Nano-devices	
09:40-10:40	<p><b>Invite (1)</b></p> <p><b>Victor Moroz</b>, Synopsys.</p> <p>Variability of 5nm/3nm/2nm FinFET and Nanowire Transistors: Counting Particles</p> <p><b>Invite (2)</b></p> <p><b>David Jamieson</b>, Univ. of Melbourne.</p> <p>Deterministic atom placement by ion implantation: Few and single atom devices for quantum computer technology</p>	NCKU Cheng Kung Hall
10:40-10:50	Coffee Break	
<b>Materials Modification</b>		
10:50-11:50	<p><b>Oral (1)</b></p> <p><b>Richard Daubriac, Mahmoud Abou Daher, Emmanuel Scheid, Joblot Sylvain, David Barge and Filadelfo Cristiano</b>, CNRS-LAAS.</p> <p>Differential Hall characterisation of shallow strained SiGe layers.</p> <p><b>Oral (2)</b></p> <p><b>Michael Ameen and Leonard Rubin</b>, Axcelis Technologies.</p> <p>Modification of poly-Si recrystallization using Si<sup>+</sup>, Ge<sup>+</sup> and As<sup>+</sup> implantation.</p> <p><b>Oral (3)</b></p> <p><b>Volker Häublein, Märít Djupmyr, Erwin Birnbaum, Heiner Ryssel and Lothar Frey</b>, Fraunhofer IISB.</p> <p>Ion Implantation of Polypropylene Films for the Manufacture of Thin Film Capacitors.</p>	NCKU Cheng Kung Hall
11:50-12:10	Closing Speech	NCKU Cheng Kung Hall

Poster Session 1	
Systems and components for beamline ion implantation, plasma doping, cluster and molecular ion beams over an ion energy range from ≈100 eV to several MeV.	
P1-1	PAS PFS a High Emission Plasma Flood for Ribbon Beam, M. Vella.
P1-2	Mass-Analyzer for Large High Current-density Ribbon Ion Beams, N. White.
P1-3	Utilization of Metal Organic Frameworks for the Management of Gases Used in Ion Implantation Devices, O. Farha, W. Morris.
P1-4	Improving Material Choices for Advanced Semiconductor Processing, T. Werninghaus, B. Mayr-Schmoelzer, M. O'Sullivan, F. Schaper and D. Hacker.
P1-5	New Material Solution for Implant Processes Containing Halogen or Oxygen, T. Werninghaus, B. Mayr-Schmoelzer, M. O'Sullivan, F. Schaper and D. Hacker.
P1-6	A dual microwave antenna plasma source, Y. Kuwata, T. Kasuya, N. Miyamoto, M. Wada, Y. Shun and Y. Watanabe.
P1-7	Extraction of a metal ion beam from a planar magnetron sputter ion source, M. Wada.
P1-8	Development of a full metal seal low energy ion source, Y. Watanabe.

P1-9	<b>Exemplary ion source for the implanting of halogen and oxygen based dopant gases</b> , T. J. Hsieh.
P1-10	<b>A medium energy range cluster ion source development</b> , Y. Shun.
P1-12	<b>Low-energy electron plasma device for ion implant charge neutralization</b> , J. Cummings.
P1-13	<b>Process robustness against photoresist outgassing in single-wafer high-energy implanters</b> , H. Kariya.
P1-14	<b>Intentional Two-Dimensional Non-Uniform Dose Implant with High Dynamic Dose Range</b> , K. Ishibashi.
P1-15	<b>Spatial Variation of Electron Energy Distribution Functions along to Field Lines on ECRIS</b> , Y. Kato.
P1-16	<b>Spatial Distribution of Multicharged Ions from Space Potentials Measured by Probe and Beam Methods on ECRIS</b> , Y. Kato.
P1-17	<b>Developing Pure Iron Evaporator and Production of Iron Ion Beam in Tandem-type Electron Cyclotron Resonance Ion Source</b> , S. Hagino.
P1-18	<b>Optimization of Mid-Electrode Potential and Extraction Gap for Miscellaneous Ion Beam from Electron Cyclotron Resonance Ion Source</b> , T. Otsuka.
P1-19	<b>High-Accuracy Two-Dimensional Intentional Non-Uniform Dose Implant:MIND 2.0</b> , S. Ninomiya.
P1-20	<b>A Beam Quality Control Method in SAion Ion Implanter</b> , S. Ninomiya.
P1-21	<b>Beamline Design of SAion Ion Implanter</b> , S. Ninomiya.
P1-22	<b>Influence of Beam-extraction Structure on the Ion Energy for Ultra-shallow Implantation</b> , N. Sakudo.
P1-23	<b>Beam Energy Purity on Axcelis Purion XE High Energy Implanter</b> , S. Satoh and J. David.
P1-24	<b>Extension of the Source Lifetime in HC Ion Implanter with Dedicated Species</b> , K. C. Su.
P1-25	<b>Advances in ion source life</b> , A. Cucchetti, A. Perel, C. Chaney, D. Sporleder, W. leblanc, M. Mccarty and B. Lindberg.
<b>TCAD modeling.</b>	
P1-26	<b>Simulation study of implantation angle variation and its impact on device performance</b> , R. D. Chang and P. H. Lin.
<b>Ion-assisted methods for advanced Photovoltaic devices and photon energy-shifting layers, etc.</b>	
P1-27	<b>Phosphorus-implanted emitter crystalline silicon solar cell with Al-BSF</b> , K. Tanahashi, M. Moriya, Y. Kida, S. Utsunomiya, T. Fukuda, K. Shirasawa and H. Takato
<b>Layer transfer for Heterogeneous Materials Integration, 3D IC stacking, etc.</b>	
P1-28	<b>Surface Modification and Activation with Gas Cluster Ion Beam</b> , T. Sasaki, N. Toyoda and I. Yamada.
<b>Nano-scale device fabrication for quantum confined films, wires and dots, Quantum Information Processing, chemical and physical sensors, etc.</b>	
P1-29	<b>Strained Si Nanowire Formation During Oxidation of Si/SiGe Fins</b> , W. M. Brewer, Y. Xin, C. Hatem and V. Q. Truong.
<b>Biotechnology: processing of bio-compatible surfaces and interfaces, fabrication of DNA-scale sensors and bio-active devices.</b>	

P1-30	<b>Surface modification of PEEK with gas cluster ion beam irradiation</b> , Y. Uouzmi, N. Toyoda and I. Yamada.
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Poster Session 2	
Planar and Non-Planar CMOS (FinFETs, nanowires, etc), 3D Memory and Power devices, Large-area Displays, LEDs, MEMS, Image Sensors, Photovoltaics, etc.	
P2-1	<b>Improved Multi-Cusp Ion Source to efficiently extract B<sup>+</sup> beam and PH<sub>x</sub><sup>+</sup> beam</b> , H. Kai, I. Nishimura, Y. Inouti, T. Matsumoto and J. Tatemichi.
P2-2	<b>Surface dopant concentration modulation for FinFet applications</b> , G. P. Lin and C. I. Li.
P2-3	<b>ALD Process for Dopant-rich Films on Si</b> , T. Seidel and M. Current.
P2-4	<b>Characteristics of SiF<sub>4</sub> Plasma Doping (PLAD)</b> , D. Raj, S. Qin, Y. J. Hu, A. McTeer and H. Maynard.
Ion processing of Si, Group IV, III-V materials, graphene, disulphides, etc.	
P2-5	<b>Channeling, Self-PAI, and Self-Sputtering Effects of Ion Implantation versus Ion Species, Energy, and Dose – Data and Modeling</b> , S. Qin.
P2-6	<b>Comparison of experimental emitter saturation current densities and simulated defect densities of boron-implanted emitters</b> , J. Kruegener, F. Kiefer, R. Peibst and H. J. Osten.
P2-7	<b>Electrical deactivation of boron in p<sup>+</sup>-poly/SiO<sub>x</sub>/crystalline silicon passivating contacts for silicon solar cells</b> , J. Kruegener, D. Tetzlaff, Y. Larionova, S. Reiter, M. Turcu, R. Peibst, J. D. Kähler and T. Wietler.
P2-8	<b>Germanium Tetrafluoride (GeF<sub>4</sub>) and Hydrogen (H<sub>2</sub>) Mixture for Implanter Performance Improvement</b> , B. Chambers, Y. Tang, S. Bishop, J. Sweeney, T. Morel and M. Biossat.
P2-9	<b>New Dopant Gas Source for Improving Productivity of Boron Implant</b> , C. Robin.
P2-10	<b>New Dopant Gas Source for Improving Productivity of Silicon Implant</b> , C. Robin.
P2-11	<b>High (5E15/cm<sup>2</sup>) &amp; Low (5E13/cm<sup>2</sup>) Dose USJ Implantation into Ge-epi on Si Wafers: Dopant Activation, Damage REcovery and Mobility Effects</b> , J. Borland.
P2-12	<b>Surface Strained Ge-Cz Wafers By Sn-Implantation For High Electron and Hole Mobility With Very Low N-well &amp; P-well Sheet Resistance</b> , J. Borland.
P2-13	<b>Sheet Resistance Dependence on Ion Angle Deviation</b> , Y. Kawasaki.
P2-14	<b>Change of V-Curve Behavior Depending on Implant Angle Deviation in Channeling Condition</b> , M. Sano.
P2-15	<b>MC3 V-curve Characteristics in Low Energy Implantation</b> , S. Kawatsu.
Materials Modification by ion implantation and thermal processing technology for etch rate and dielectric constant modification, junction contact and metal gate work function tuning, PR stabilization for multi-exposure lithography, etc.	
P2-16	<b>Thermal stability of Cobalt Silicide on Polysilicon Implanted with Germanium</b> , Z. J. Ko.
P2-17	<b>Carbon Implantation Performance Improvement by Mixing Carbon Monoxide (CO) with Carbonyl Fluoride (COF<sub>2</sub>) and Carbon Dioxide (CO<sub>2</sub>)</b> , Y. Tang, S. Yedave, O. Byl, J. Despres, E. Tien, S. Bishop and J. Sweeney.
P2-18	<b>Hydrogen Selenide (H<sub>2</sub>Se) Dopant Gas for Selenium Implantation</b> , Y. Tang, S. Yedave, J. Despres, O. Byl, J. Sweeney.



<b>New doping techniques: "monolayer" dopant-organic films, ALD, selective CVD/epi, MOCVD, laser-assisted doping, thermal and recoil mixing methods, etc.</b>	
P2-19	<b>Investigation of Boron Gas Mixtures for Beamline Implant</b> , Y. Tang, O. Byl, S. Yedave, J. Despres and J. Sweeney.
P2-20	<b>Diffusion Suppression of Delta Doped Phosphorus in Germanium by Implantation of Nitrogen</b> , A. Scheit, T. Lenke and Y. Yamamoto.
<b>Metrology methods: elemental, electrical and morphological analysis of 3D devices, junctions, strain, interfaces and contacts, in-line process controls, etc.</b>	
P2-21	<b>Inspecting the restructure of ultra-low energy Boron implanted Si(110) by nonlinear optics</b> , K. Y. Lo.
P2-22	<b>A novel method for simultaneous on wafer level monitoring of ion implantation energy and dose</b> , M. Jelinek, M. Lugger, N. Siedl, W. Schustereder, C. Krüger and M. Wagner.
P2-23	<b>Demonstration of Stable Operation of a Microwave Ion Source with Beam Current Greater than 100 mA H<sup>+</sup> and Beam Voltage Up to 320 kV</b> , E. Sengbusch, P. Barrows, G. Becerra, A. Kobernik, L. Campbell, C. Seyfert, S. Christensen and R. Radel.
<b>Biotechnology: processing of bio-compatible surfaces and interfaces, fabrication of DNA-scale sensors and bio-active devices.</b>	
P2-24	<b>Cluster Ion Beams for Organic Semiconductors and Biological Materials</b> , J. Matsuo, K. Suzuki, M. Kusakari, T. Seki and T. Aoki.
<b>Advanced Thermal Annealing: Flash, Laser, Microwave, Neutral Beams, etc.</b>	
P2-25	<b>Dopant activation control using soak pulses in Flash Lamp Annealing</b> , M. Abe, K. Fuse, S. Kato, T. Aoyama and I. Kobayashi.
P2-26	<b>Photoluminescence Studies on High Activation of Silicon Dopants in InGaAs with Ultra Low Temperature Microwave Annealing</b> , T. L. Shih, T. C. Kuo, C. I. Li, C. P. Lin and W. H. Lee.
P2-27	<b>Studies on Ultra Shallow Junction n-MOS with 300°C Microwave Annealing for Activation of Phosphorus Dopants in Germanium</b> , W. C. Lin, T. L. Shih, C. I. Li, C. P. Lin and W. H. Lee.
P2-28	<b>Investigation of spike annealing global and local uniformity by different heating approaches</b> , H. Yonggen.
P2-29	<b>Strained Si Nanowire Formation During Oxidation of Si/SiGe Fins</b> , W. Brewer and K. Jones.