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| **George B. Ulrich** |
| C:\Users\gbu\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\UX3B3LYA\2014-P05597 (5).jpg | Program Manager - Radioisotope Power Systems ProgramMaterials Science & Technology DivisionOak Ridge National LaboratoryP.O. Box 2008Oak Ridge, TN 37831-6079Phone: (865) 576-8497Cell: (865) 567-8446email: ulrichgb@ornl.gov |

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|  **Professional Interest**Research, development, characterization, testing, and production of high temperature materials and components for compact power systems. **Experience*** *2021-present* – Group Leader (interim), Metals and Composites Processing, Materials Science and Technology Division, Oak Ridge National Laboratory
* Group emphasis - developing processing techniques for metal and composite use in challenging environments by understanding pathway, thermodynamic, and kinetic connections with material behavior.
* Capabilities - melting (arc, vacuum arc remelt, electron beam, air induction) and casting, mechanical processing (extrude, roll, draw, forge, press), heat treating and sintering, and cleaning (detergent, acid, KCN), powder metallurgy of high temperature alloys and composites, plus mechanical testing/analysis.

 * *2014-2021* – Group Leader, Alloy Behavior and Design, Materials Science and Technology Division, Oak Ridge National Laboratory
* Group emphasis - materials design and improved fundamental understanding based on advanced characterization (e.g., microstructural, mechanical, x-ray and neutron scattering), and modeling techniques utilizing computational thermodynamics and phase diagrams.
* Managed personnel providing expertise in computational modeling and design, synthesis and processing, mechanical and microstructural characterization, alloy design and selection for new structural and functional materials applications in extreme environments (cryogenic, high-temperature, radiation, high mechanical loading, oxidizing, and corrosive). Classes of materials included steels, stainless steels, iron and nickel base heat-resistant alloys and superalloys, lightweight metals, intermetallics, high entropy alloys, precipitation strengthened TRIP/TWIP alloys, refractory alloys, powder metals/oxide dispersion strengthened, and platinum group alloys. Laboratory facilities included melting, casting, heat treating, thermomagnetic and powder processing.

 * *2013-present* – Program Manager, Radioisotope Power Systems (RPS) Special Component Manufacturing and Testing Program, Materials Science and Technology Division, Oak Ridge National Laboratory - $6M annual program
* Develop and manage technical direction and milestones, schedules, and budgets for fabrication, characterization, testing, and maintenance activities.
* Cultivate customer relationships with DOE NE-3 (Office of Nuclear Infrastructure), NASA, DOE-ORNL Site Office and security program customers as well as interact and collaborate with other national laboratories (LANL, INL, SNL) and contractors (University of Dayton Research Institute, Teledyne Energy Systems, Aerojet Rocketdyne, and others).
* Promote the ORNL role as the lead materials laboratory for the national RPS Program by continuing to develop, evaluate and produce high-temperature materials and fabricate these materials into heat source components for high-impact national/international missions.
* Perform succession planning/training for task managers, technicians, and craft persons to ensure program capability and continuity.
* *1996–2013* – Assistant Program Manager (2006 -2013) plus Task Manager for Clad Vent Set and Light Weight Radioisotope Heater Unit Manufacturing and Nuclear Launch Safety Tasks for RPS Materials, Production, and Technology Program, Materials Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN - $1.5M+ activities
* Prepared annual production plans including budget requests and milestones for task activities.
* Supervised personnel for hardware production and testing.
* Managed quality requirements for production, including maintenance and documentation of training and retraining of personnel, calibration of equipment, and records generation and storage.
* Prepared contributions to weekly, monthly and annual program reports.
* Managed purchase and receipt of materials, tooling, and equipment in accordance with quality and safety requirements.
* Created and maintained process procedures and equipment operating guidelines.
* Managed maintenance, upgrade, replacement, and safe operation of equipment as needed to ensure production capability.
* *1987–1996* – Engineer, Development/Clad Vent Set Manufacturing (CVS), Y-12 Plant, Oak Ridge, TN
* Clad Vent Set Manufacturing Experience: involved in all aspects of iridium alloy CVS manufacturing, including technology transfer from Mound Plant to Y-12 Plant as well as Y-12 Plant to Oak Ridge National Laboratory. Conducted studies and authored technical reports evaluating and characterizing various aspects of iridium alloy CVS manufacturing. Member of CVS and Blank and Foil Production Configuration Control Boards and Material Review Boards.
* Management Responsibilities: CVS Manufacturing Task ($2.3M annually) Y-12 Plant Technical Leader for RPS Program. Principal Investigator for joint U.S./Russian project ($1.1M) entitled “Advanced Recycling of Commingled Metals” for U.S. Department of Energy Initiatives for Proliferation Prevention Program. Identified, proposed, and managed implementation of $920K weapon program cost savings. Division representative for weapon program. Production methods demonstration project leader. Co-op student supervisor.
* *1981-1990* – Production/Process Engineer, Y-12 Plant
* Product Metallurgist Duties: Ensured specification requirements were met for various materials including iridium, alloy and stainless steels, aluminum alloys, titanium alloys, iron, uranium alloys, tantalum, and other special materials.
* Process Metallurgist Duties: Ensured materials were properly processed through vacuum induction melting furnaces, 7500-, 1500-, 450-, or 35-ton hydraulic presses, 66"-wide 4-high rolling mill, foil rolling mill, hydroforms, rotary swaging machines and/or numerous heat treat facilities utilizing vacuum, inert, or air atmosphere, or salt baths. Responsible for developing, characterizing, and optimizing processes and material properties.
* Liaison Metallurgist Duties: Technical consultant - performed failure analyses and recommended alternative materials and processes. Extensive interaction with metal working, plating, machining, inspection/test, and assembly production personnel as well as vendor, design, development, and research personnel. Involved in $7M forging procurement and $1.5M equipment procurement. Temporary assignment with design group at Los Alamos National Laboratory, Los Alamos, New Mexico.
* *1977-1980* – Steel Metallurgist (Professional Practice Program), Republic Steel, Canton, Ohio
* Lab Metallurgist: (Final Assignment) Conducted feasibility analysis of replacing oil with an aqueous polymer quenchant for numerous alloy steels. Performed numerous metallurgical claim investigations.
* Assistant Process Metallurgist: (Middle Assignments) Performed studies in 8", 12" and 18" bar rolling mills, heat treat, and bar finish areas as well as cold strip and sheet mills.
* Assistant Process and Product Metallurgist: (Early Assignments) Performed studies in alloy and stainless steel electric melt shop and continuous casting facility with vacuum degassing unit and AOD vessel.

**Education**B. S., Metallurgical Engineering (Professional Practice Program), University of Cincinnati, 1981**Activities/Honors** * U. S. DOE Secretary of Energy Achievement Award for Mars 2020 Perseverance Rover Radioisotope Power Systems Team - 2021
* U. S. DOE Secretary of Energy Achievement Award for Mars Science Laboratory Multi-Mission Radioisotope Thermoelectric Generator - 2012
* Registered Professional Engineer in the State of Tennessee (inactive status)
* Member of ASM International
* ORNL Significant Event Award for Clad Vent Set Manufacturing
* Martin Marietta Award of Excellence for Technical Achievement
* U.S. DOE Weapons Program Award of Excellence for Significant Program Cost Savings
* U.S. DOE Weapons Program Award of Excellence for Project/Process Implementation
* U.S. DOE Quality Improvement Award
* Martin Marietta Energy Systems President’s Award for Performance Improvement
* Delta Tau Delta Fraternity Scholarship and Intramural Award
* Mary Rowe Moore Admission with Distinction Award from the University of Cincinnati

**Publications**1. George B. Ulrich, Cecil A. Carmichael, Ashli M. Clark, Kevin. M. Faraone, Nidia C. Gallego, Easo P. George, Kevin O. Hanson, Roger G. Miller, Govindarajan Muralidharan, Glenn R. Romanoski, Ian A. Stinson, and Kenneth R. Veach, Jr., (September 2022), “Oak Ridge National Laboratory Annual Technical Progress Report of Radioisotope Power Systems Special Component Manufacturing and Testing Program for October 1, 2020 through September 30, 2021,” ORNL/TM-2022/2615, Oak Ridge National Laboratory, Oak Ridge, TN.
2. John S. Neal, Miting Du, Lorenzo Fabris, Bradley R. Johnson, Zain Karriem, Benjamin E Lewis Jr., Roger Miller, Brenda A. Smith, Michael B. R. Smith, Neil Taylor, George Ulrich, Hsin Wang, and Mike Zach, (September 2021) “FY21 Assessment of Oak Ridge National Laboratory Radioisotope Power Systems Program Development,” Oak Ridge National Laboratory, Oak Ridge, TN.
3. Glenn R. Romanoski, Kenneth Rex Veach, Jr., Dean Freeman II, Roger G. Miller, and George B. Ulrich, (September2021), “Reinspection of Pyrolytic Graphite Insulators for Radioisotope Heater Units,” ORNL/TM-2021/2211, Oak Ridge National Laboratory, Oak Ridge, TN.
4. G. B. Ulrich, C. A. Carmichael, A. M. Clark, K. M. Faraone, N. C. Gallego, E. P. George, K. O. Hanson, N. M. Kohlhorst, R. G. Miller, G. Muralidharan, G. R. Romanoski, K. R. Veach, Jr., (June 2021), “Annual Technical Progress Report of Radioisotope Power Systems Special Component Manufacturing and Testing Program for October 1, 2019 through September 30, 2020,” ORNL/TM-2021/1995, Oak Ridge National Laboratory, Oak Ridge, TN.
5. H. Wang, D. T. Hoelzer, C. A. Carmichael, J. Kolopus, A. F. May, E. Cakmak, and G. B. Ulrich, (July 2021), “Reproduction of Heritage SiGe by Vacuum Casting: Processing and Characterization”, ORNL/TM-2021/2014, Oak Ridge National Laboratory, Oak Ridge, TN.
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7. Ulrich, G. B., Carmichael, C. A., Clark, A. M., Friske, B. R., Gallego, N. C., George, E. P., Kohlhorst, N. M., Miller, R. G., Muralidharan, G., Romanoski, G. R., and Veach, K. R., Jr., (June 2020), “Annual Technical Progress Report of Radioisotope Power Systems Special Component Manufacturing and Testing Program for October 1, 2018 through September 30, 2019,” ORNL/TM-2020/1562, Oak Ridge National Laboratory, Oak Ridge, TN.
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9. Romanoski, G., Lach, K., Monaghan, K., Clark, A., Gallego, N., and Ulrich, G., (February 2019), “An Investigation of the Rheological Behavior of Phenolic Resins Considered for Production of Carbon Bonded Carbon Fiber Insulation,” Nuclear and Emerging Technologies for Space, American Nuclear Society Topical Meeting, Richland, WA.
10. Gallego, N., Romanoski, G., Clark, A., and Ulrich, G., (February 2019), “Evaluation of Alternative Fibers to Replace NARC-Rayon for the Production of CBCF,” Nuclear and Emerging Technologies for Space, American Nuclear Society Topical Meeting, Richland, WA.
11. Robert Michael Wham, George Behrens Ulrich, Jacquelyn Candelaria Lopez-Barlow, Stephen Guy Johnson, Constant Rate Production: DOE Approach to Meeting NASA Needs for Radioisotope Power Systems for Nuclear-Enabled Launches, *American Journal of Aerospace Engineering*. Vol. 5, No. 2, 2018, pp. 63-70. doi: 10.11648/j.ajae.20180502.11
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