



2015 Scientific Advisory Committee Meeting
Hampton Inn Hotel, Richland, WA
September 1 – 2, 2015

FY2016 Research and Operation

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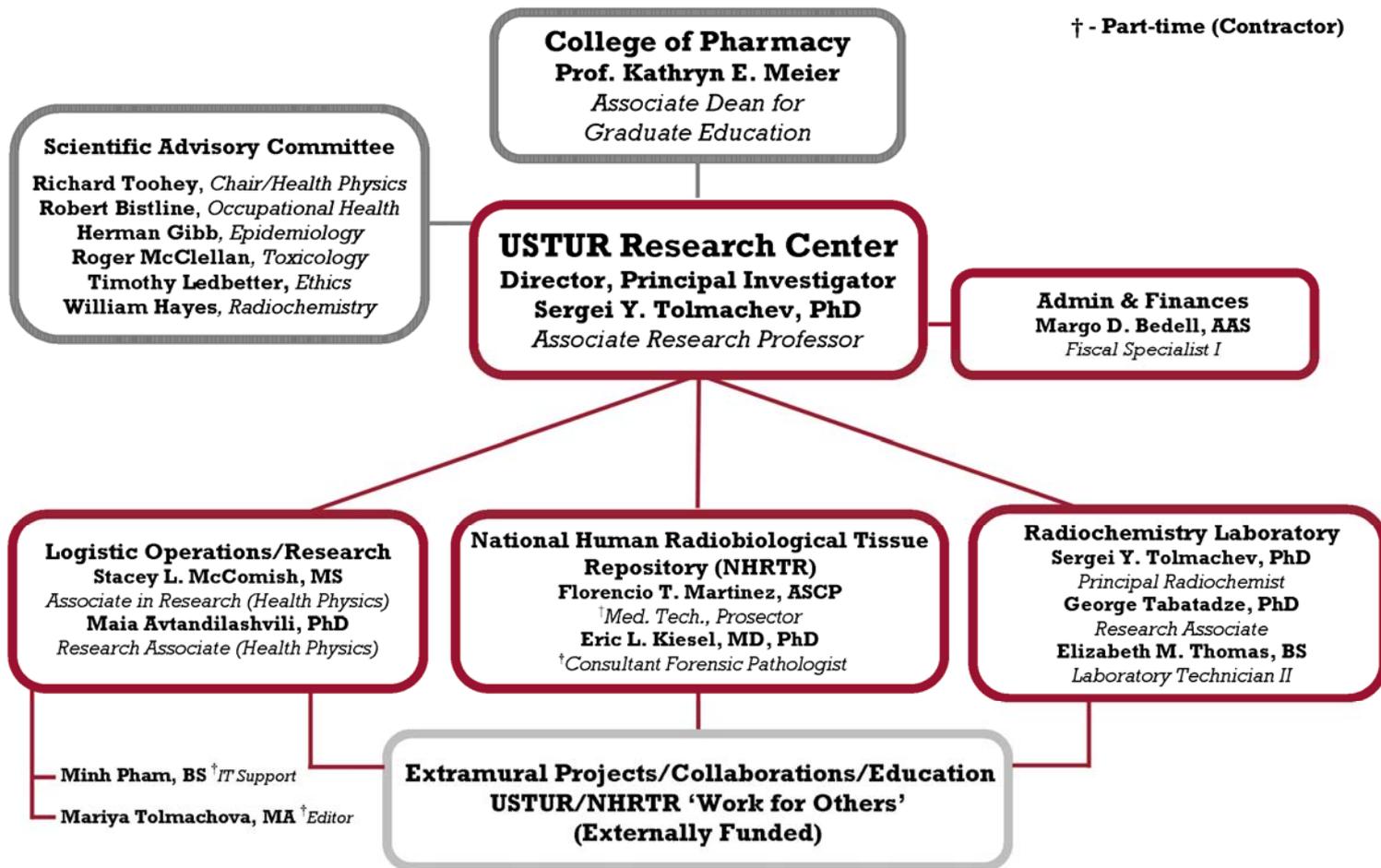
www.ustur.wsu.edu

*“Learning from Plutonium and
Uranium Workers”*





USTUR Organization Structure





Personnel

- Stacey L. McComish: 1.0 FTE → 0.5 FTE (effective 9/1/2015)

FY2016 total FTE: 5.7

- PI, Director: 1.0
 - Research Faculty: 2.7
 - Technical Personnel: 1.0
 - Administrative Personnel: 1.0
-
- Ronald L. Kathren (WSU): Professor Emeritus
 - Alan Birchall (PHE, UK): Adjunct Professor (8/1/2015 – 7/31/2018)
 - Thomas L. Rucker: SAC Representative, Radiochemistry (10/1/2015 – 09/31/2018)





FY2016 Funding

- Agency: U.S. Department of Energy
 - Office: Domestic and International Health Studies (AU-13)
*Management and Operation of the United States
Transuranium and Uranium Registries (4/1/2015 – 31/3/2016)*
 - Awarded: \$900,000
 - U.S. DOE Joint Coordinating Committee for Radiation
Effects Research (JCCRER Project 2.4)
*Characterization of ‘Bound’ Plutonium Retention in the
Human Respiratory Tract (Plutonium Oxide)*
 - Available: \$20,406
- FY2016 total: \$920,406





2016 Research and Operational Tasks

- Maximize USTUR scientific research
- Publish results of the USTUR research
- Celebrate 50th Anniversary of the Registries
- Involve in academic activities
- Accept Registrants' tissue donations
- Analyze donated tissues
- Populate Health Physics database
- Populate Radiochemistry database
- Continue NHRTR inventory





Research Concept

USTUR Research Center: Intramural Project

Sergei Y. Tolmachev, PhD, PI & Director, Associate Research Professor

Radiochemistry & Mass Spectrometry

Sergei Y. Tolmachev, PhD & George Tabatadze, PhD

- Expeditious Analysis of Donated Tissues
- Application of New Actinide Separation Techniques
- Application of Advanced Measurement Techniques

Tissue Repository & Databases

Stacey L. McComish, MS & Maia Avtandilashvili, PhD

- National Human Radiobiological Tissue Repository (NHRTR)
- Health Physics, Pathology
- Radiochemistry

Extramural Projects/Collaborations

- AREVA, Richland, WA
- MSU, Denver, CO
- NWU, Chicago, IL
- CERAD, Oslo, Norway
- U. Laval, Quebec, Canada
- Health Canada, Ottawa, Canada
- SUBI, Ozyorsk, Russia

Pacific Northwest National Laboratory

Radiation Detection
Brian Miller, Scientist

Radiological Science
Bruce Napier, Manager

Radiation Biology
William Morgan, Director

Center for Countermeasures
Against Radiation
Dunstana Melo, Director

Public Health England
John Harrison, Coordinator

EURADOS: WG7/WG10
Maria Lopez, WG7 Chair
Clemens Woda, WG10 Chair

Washington State University, Tri Cities

GCP in Radiation Protection
James Pratt, Chair

College of Nursing
Susan Campbell, Director

KIT/Radioanalytical Lab
Bastian Breustedt, Head

“Work for Others”





Ongoing Research Projects

- Testing NCRP Wound Model: **USTUR**
- From Single Bone to Total Skeleton: **USTUR**
- Uranium Missing Dose: **USTUR**
- Systemic Plutonium – ^{238}Pu vs ^{239}Pu : **USTUR**
- Plutonium Bound Fraction: **USTUR/JCCRER/PHE**
- Radionuclide Bone Microdosimetry: **USTUR/PNNL**
- Modeling Multiple Intakes: **USTUR/PHE**
- ^{241}Am Chelation Therapy Modeling: **USTUR/KIT**





Papers in Preparation

- Brooks AL, Church BW, Smith JN, Tolmachev SY. Annual ^{137}Cs environmental half-life without remediation: Impact on radiation dose. *Jap J Health Phys*; 2015 (Submitted)
- Tolmachev SY, Kathren RL. Estimation of total skeletal content of Pu and Am from analysis of a single bone. *J Radiol Prot*
- Tolmachev SY, Nielsen CE, Avtandilashvili M, Puncher M, Martinez F, Thomas EM, Miller FL, Morgan WF, Birchall A. MWDS 2013: Soluble plutonium distribution in the lungs of an occupationally exposed worker. *Radiat Prot Dosim*
- Puncher M, Birchall A, Tolmachev SY. MWDS 2013: A re-analysis of USTUR case 0269 to determine whether plutonium binds to the lungs. *Radiat Prot Dosim*
- Suslova KG, Orlova IA, Burikova EA, Sokolova AB, Salamatova VY, Tolmachev SY, Miller SC. MWDS 2013: Estimation of plutonium skeletal content from limited autopsy bone samples from Mayak PA workers. *Radiat Prot Dosim*





2015 – 2016 Conference Presentation/Attendance

- 143rd Annual Meeting of American Public Health Association (2015)
- 61st Annual Radiobioassay and Radiochemical Measurements Conference (2015)
- 61th Annual Meeting of the Radiation Research Society (2015)
- 3rd International Symposium on the System of Radiological Protection (2015)
- 18th International Conference on Genomics and Pharmacogenomics (2016)
- EFCOG Annual Meeting (2016)
- EURADOS Annual Meeting (2016)
- 61th Annual Meeting of the Health Physics Society (2016)





New Research Collaborations





Registries' 50th Anniversary

Margo D. Bedell & Sergei Tolmachev



National Plutonium Registry: *US AEC Vision, 1966*



National Plutonium Registry: *Blue Ribbon Committee*, 1968



*Standing Left to Right: Carlos E. Newton, Jr., W. Daggett Norwood, H.D. Bruner, Philip A. Fuqua.
Seated Left to Right: Thomas F. Mancuso, J.H. Sterner, Robley D. Evans, Herbert M. Parker.
Not Photographed: Clarence C. Lushbaugh, Lloyd M. Joshel.*

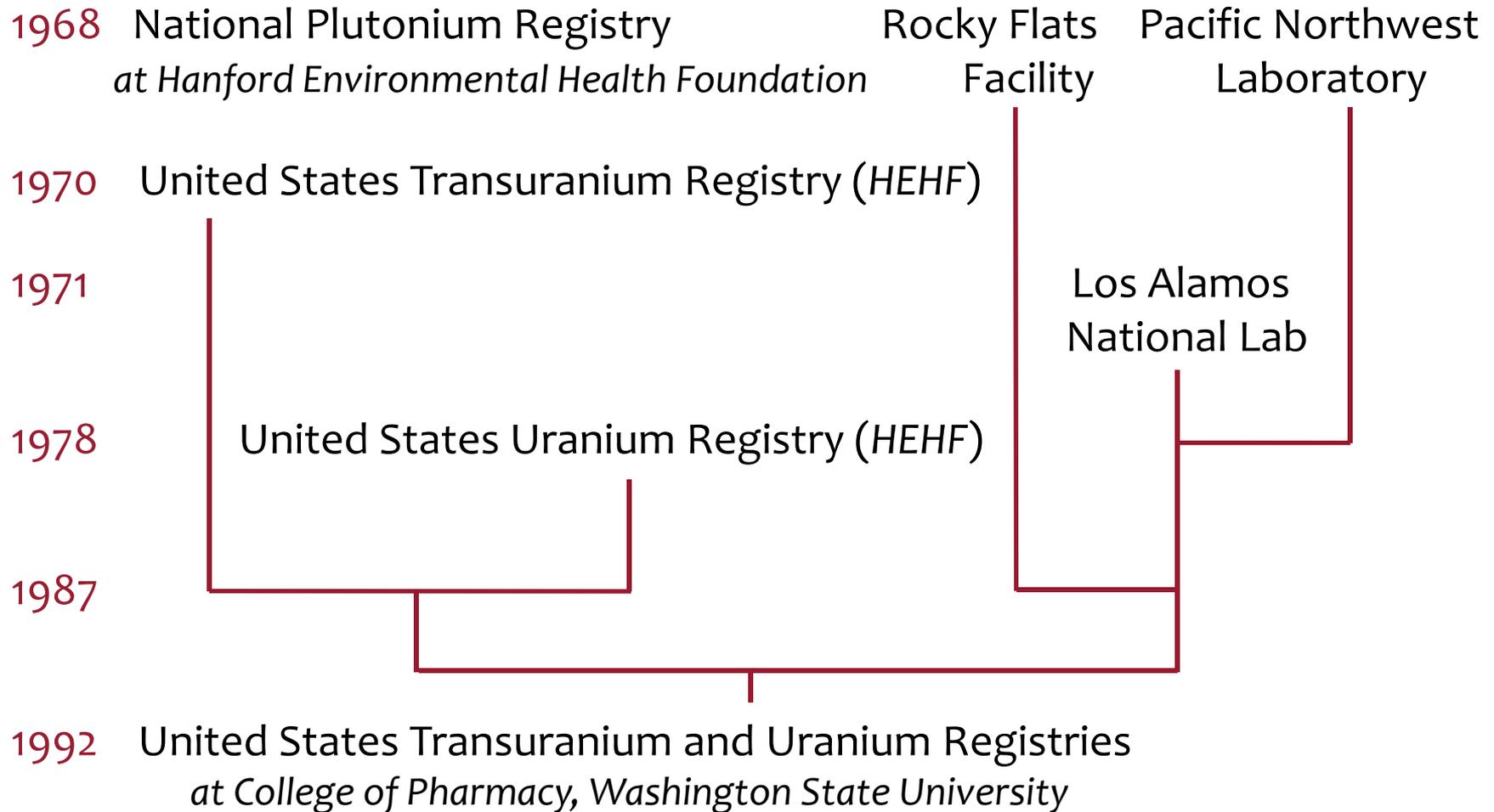




Genealogy of the USTUR

REGISTRIES MANAGEMENT

ANALYTICAL SUPPORT





50th Anniversary Events: 2016 – 2018

- One-day Special Session on USTUR Research at Health Physics Annual Meeting, Spokane, WA (2016)

USTUR: Five Decade Follow-up of Plutonium and Uranium Workers

- USTUR/COP/WSU Booth at HPS Annual Meeting (2016)
- Publications list of the United States Transuranium and Uranium Registries, 1994 – 2015 (2016 – 2018)
- Special issue of Health Physics journal (2017 – 2018)





Academic Involvement

*Maia Avtandilashvili, Stacey L. McComish
George Tabatadze & Sergei Y. Tolmachev*





Work Together

- WSU College of Pharmacy
- WSU Graduate Certificate Program in Radiation Protection: *Alpha Spectrometry Laboratories*
- WSU College of Nursing: *Autopsies*
- Kyushu University, Central Institute of Radioisotope Sciences and Safety: *Lectures and seminars, student exchange*
- Laval University, Department of Chemistry
- Iowa University, Department of Radiology





New Courses in Radiological Science Course at WSU/TC

- ENVR_SCI 406 Introduction to Radiological Science

Fundamentals of atomic physics; interactions of radiation with matter; radiation dosimetry and biology, radioecology and radiological health protection. Recommended preparation: 12 semester hours from any 2 or more of the following subjects: biology, chemistry, calculus, or physics

- ENVR_SCI 520 Radiation Instrumentation

*Review of nuclear physics as needed to understand how various radiation instruments work; gas filled detectors; air sampling practices; statistics and uncertainty of radiation measurements; gamma ray spectrometry (including scintillation and germanium spectrometers); **alpha spectrometry**; and radiation dosimetry (with optically stimulated emission) are among the subjects to be covered*





Work Toward

- Research Professor

Sergei Y. Tolmachev (College of Pharmacy)

Affiliation with WSU/TC campus – dual appointment?

- Adjunct Professor

Daniel J. Strom (Pacific Northwest National Laboratory)





Accepting Registrant Donations & New Registrants

Stacey L. McComish & Margo D. Bedell

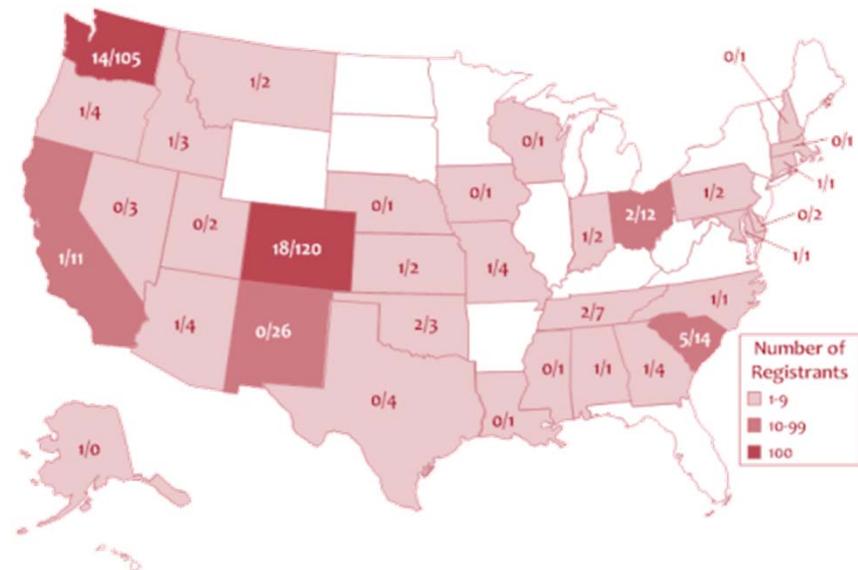




Registrant Statistics

- Living Registrants: 55
 - ✓ Whole-body donors: 7
 - ✓ Partial-body donors: 42
 - ✓ Special studies†: 6

† - not a tissue donor



Living/Deceased Registrants





USTUR Demographics: Age

Age, y	Whole-Body	Partial-Body
<i>Living Registrants</i>		
Mean \pm SD	80 \pm 9	82 \pm 10
Median	79	83.5
Range	63 – 90	44 – 94





Radiochemistry Program

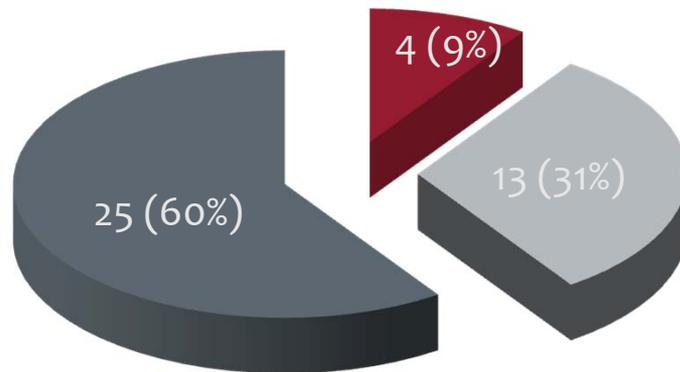
*Elizabeth M. Thomas, George Tabatadze,
Sergei Y. Tolmachev*





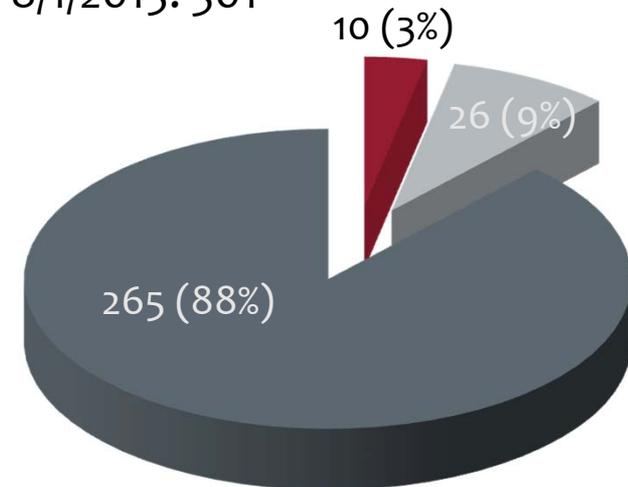
Donation Analysis Status 2015

8/1/2015: 42



■ Intact ■ Incomplete ■ Complete

8/1/2015: 301



■ Intact ■ Incomplete ■ Complete

Intact – no tissue samples were analyzed

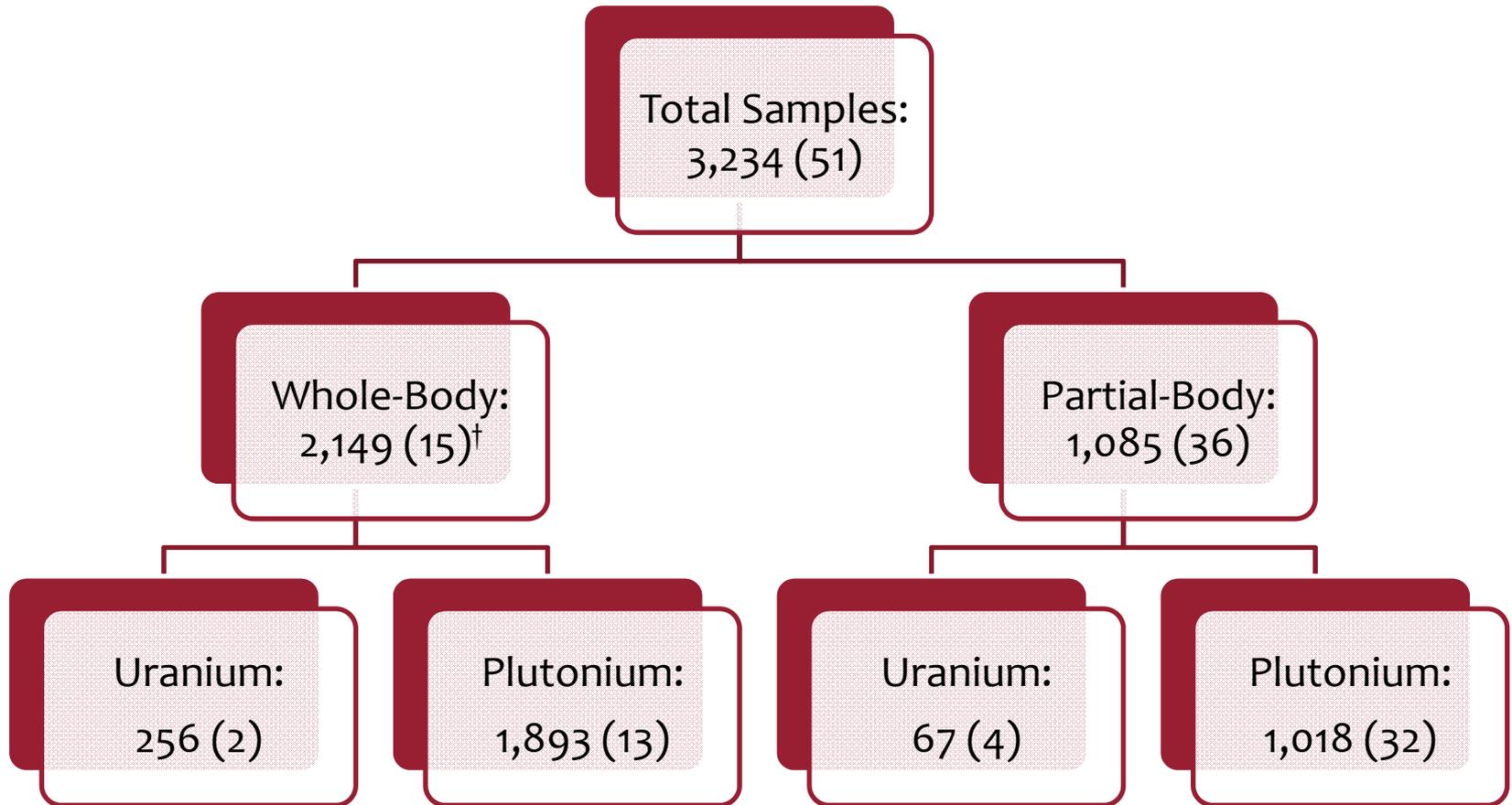
Incomplete – few samples were analyzed; ‘survey’ analysis completed

Complete – no samples need to be analyzed





Tissue Sample Backlog 2015



† - number of cases excluding Thorotrast (2)





Radiochemistry Tasks 2016

- Eliminate intact cases
- Reduce tissue sample backlog
- Improve analysis logistic
- Complete DQO (2016 – 2017)





Current Intact Cases

- Whole-body donations (3):
0391 (2006), 0834 (2007), 0757 (2012)
- Partial-body donations (10):
0443(2006), 0702(2006), 0658(2007), 0695 (2008),
0771(2008), 0800 (2009), 0958(2009), 0385(2010),
0521(2010), 0787 (2015)
- Whole-to-Partial ratio 1:3





Tissue Radiochemical Analysis 2016

- Drying/Ashing
- Digestion/Dissolution
- Radiochemical Separation
- α -source Preparation
- Actinide Measurements

- Analysis Completed 350 – 400[†]
- Sample Processed 500
- Completed/Processed 0.7 – 0.8

† – expected value





Tissue Sample Backlog: Priority Breakdown

Donation	Status	#	\$\$\$	\$\$	Total
Whole	Intact	3 [†]	60	45	105
Partial	Intact	10	200	150	350
Whole	Incomplete	12 ^{†,‡}	----	90	90
Partial	Incomplete	26	----	390	390
Total		51	260	675	935

† - number of cases excluding Thorotrast

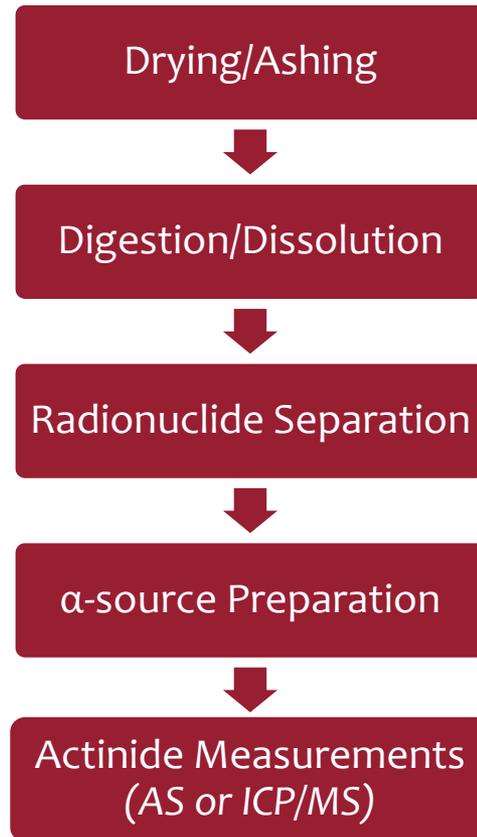
‡ - only 6 cases have \$\$-value tissue samples





Analysis Logistic Improvement

- Optimization of analytical sequence





Health Physics Database

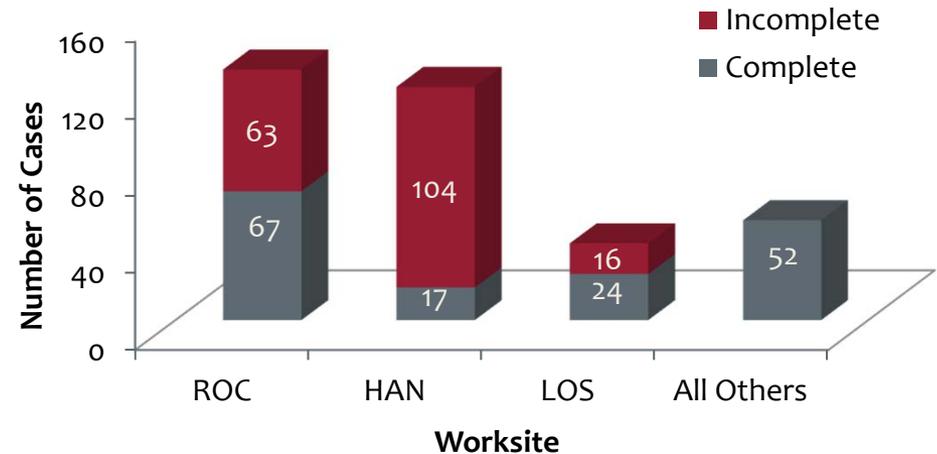
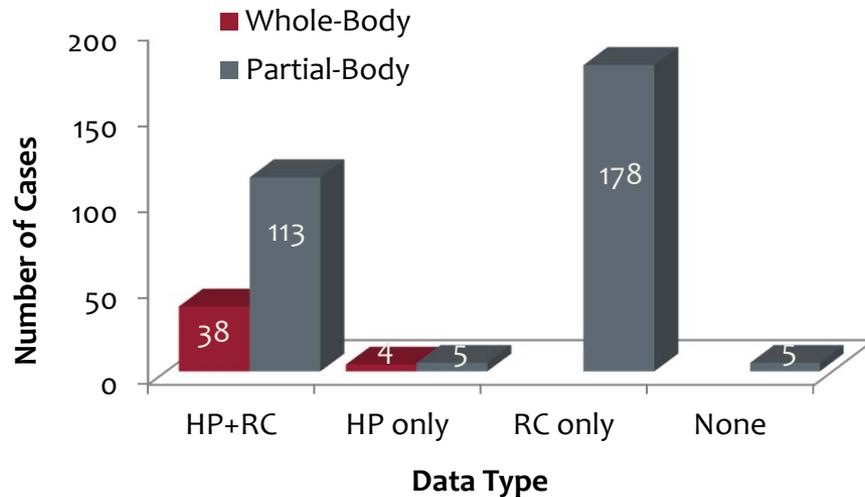
Maia Avtandilashvili





Health Physics Tasks 2016

- Complete all Los Alamos cases
- Continue Rocky Flats cases



- Complete no radiochemistry - no health physics data ('None') cases





Radiochemistry Database

*Stacey L. McComish, George Tabatadze &
Sergei Y. Tolmachev*



Radiochemistry Database Tasks 2016

- Review existing radiochemistry data in the database (2005)

United States Transuranium and Uranium Registries

Case No:

Intake Type:
Contaminant(s):

Admin | Medical | Rad Chem | Health Physics | Clinical | Pathology | Next of Kin

Lab	Nuclide	Tissue	Wet_wt	Ash_wt	Conc_wet	Conc_ash	Sd_wet	Sd_ash
LANL	Am-241	ADRENAL	14.1		1.48E+01	0.00E+00	8.75E-01	0.00E+
LANL	Pu-238	ADRENAL	14.1		1.42E-02	0.00E+00	3.78E-02	0.00E+
LANL	PU-239	ADRENAL	14.1		5.20E-02	0.00E+00	3.07E-02	0.00E+
LANL	PU-239	AORTA	83		2.93E-02	0.00E+00	8.43E-03	0.00E+
LANL	Pu-238	AORTA	83		-2.42E-03	0.00E+00	4.43E-03	0.00E+
LANL	Am-241	AORTA	83		8.83E+01	0.00E+00	4.52E+00	0.00E+

Radchem Complete
Radchem Entered

- Identify cases with radiochemistry data but not in database
- Develop standardized data entry format
- Start data entry





National Human Radiobiological Tissue Repository (NHRTR)

Stacey L. McComish & Sergei Y. Tolmachev





NHRTR Inventory

- Perform new tissue samples inventory as received
- Continue inventory of tissues from radium workers
- Continue inventory of LANL acid solutions
- Complete inventory of planchets
- Estimate NHRTR total 'RAM' holding





ACJ Scholarship at WSU/TC

GAXNOPG

Account Number:

The Anthony C James/USTUR Professional Development Scholarship Fund

There is hereby established with the Washington State University Foundation the The Anthony C James/USTUR Professional Development Scholarship Fund to be administered within the , account number . This Fund is established by Janet E. James, 129 Patton Street, Richland, WA 99354-1618 with gifts made according to the terms described in the Procedures section below which shall total . Additional gifts may be made under the terms of this agreement to this fund during the donor's lifetime and/or at her death.

PROCEDURES

Any and all contributions shall be administered in the manner set forth herein, and disbursements shall be made in accordance with the provisions specified in this document. The governing board of the WSU Foundation, or its designee, shall have full and plenary power and authority to take, hold, manage, invest and reinvest any principal hereunder, and any increase or accumulation to it, and any income from it, consistent with management policies of the WSU Foundation, or its designee.

USES AND PURPOSES

The financial distributions from the Anthony C James/USTUR Professional Development Fund shall be distributed to the Herbert M. Parker Fund #17A-5601-5769. It shall be tracked as a sub-account of the Parker Memorial Fund to provide one or more need based scholarships to a Parker Scholar according to the following criteria:

The gift shall be used to provide one or more scholarships according to the following criteria:

- Undergraduate or graduate (full-time) students at Washington State University Tri-Cities
- Majoring in the natural-based sciences and/or any applied or specialized field derived from them, including agricultural sciences; pre-medical, pre-dental, pre-veterinary, and pre-pharmacy studies; nursing; mathematics including statistics; engineering and science education.
- Citizen or legal resident of the United States
- Minimum of a 3.5 on a 4.0 GPA scale
- Awards shall be based on merit

This scholarship shall be awarded according to WSU's Policy for Administering Financial Aid Restricted by Race, Gender, Color, Ethnicity or National Origin.

Expenditures may be made for all WSU "common expenditure objects," subject to the limitation that they be used in the performance of official duties for purposes that advance the mission of the University.

The uses and expenditures of this gift shall be consistent with Washington State University policies. This gift shall be administered by the Chancellor of WSU Tri-Cities or his/her designee(s). The administrator of this fund shall be responsible for (1) monitoring contributions to and disbursements from this fund's expendable account, ensuring that disbursements from that account are used in accordance with this agreement; (2) coordinating the work of any selection committee, if required; and (3) ensuring, in coordination with the WSU Foundation, proper stewardship of the donor to this fund and/or other interested parties. Any program or project supported hereunder must be consistent with the tax-deductible status of gifts made to the Washington State University Foundation.

CHANGE OF CONDITIONS

If, at some future date, circumstances within the WSU Foundation or Washington State University should change so that the uses and purposes for which the Fund has been established are no longer existent, are in conflict with administrative or academic policies of the University, or if the University is unable to meet the intent of the donor(s), then this Agreement may be revised by the WSU Foundation and Washington State University so that Fund distributions and principal may then be used in a manner which is in the best interests of Washington State University, bearing in mind the wishes of the donor(s) set forth herein. In this unlikely event, every effort shall be made by the WSU Foundation to consult the donor(s) prior to any change in fund disbursement.

PRIVACY STATEMENT

The donor(s) intend(s) that all information related to their gifts NOT be publicly disclosed except as provided for in the WSU Foundation Privacy Policy.

ENTIRE AGREEMENT

There are no verbal agreements or understandings that modify this Agreement. This agreement cannot be amended unless it is in writing by the parties to the original agreement. This Agreement constitutes the full understanding between the donor(s), the WSU Foundation, and Washington State University.

_____, dated this _____ day of _____, 2_____
Janet E. James

_____, dated this _____ day of _____, 2_____
John C. Gardner, PhD
Chief Executive Officer
Washington State University Foundation

_____, dated this _____ day of _____, 2_____





Thank you

