

Curriculum Vitae of Valsamo (Vallia) Antoniou

PERSONAL Smithsonian Astrophysical Observatory E-mail: vantoniou@cfa.harvard.edu
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Nationality: Greek (U.S. permanent resident)

RESEARCH INTERESTS Multi-wavelength studies of stellar populations; Formation and evolution of accreting binaries; Physical properties of pulsars; Accretion disks around compact objects; Large area/deep X-ray surveys; X-ray source populations; Massive stars at low metallicities; Star-formation history and evolution of Local Group galaxies; Star-forming/starburst galaxies

EMPLOYMENT

Smithsonian Astrophysical Observatory September 2013 – Present
Postdoctoral Fellow
(Advisors: Drs. J. Drake, A. Zezas; jdrake@cfa.harvard.edu)

Iowa State University June 2010 – May 2013
Affiliate Assistant Professor, Department of Physics & Astronomy

Iowa State University December 2009 – May 2010
Postdoctoral Research Associate, Department of Physics & Astronomy
(Advisor: Prof. M. Marengo; mmarengo@iastate.edu)

Smithsonian Astrophysical Observatory February 2009 – July 2009
Visiting Scientist
(Advisors: Dr. A. Zezas; azezas@cfa.harvard.edu)

Smithsonian Astrophysical Observatory June 2008 – November 2008
Visiting Scientist
(Advisors: Dr. A. Zezas; azezas@cfa.harvard.edu)

EDUCATION

University of Crete, Greece May 2008
Degree awarded: PhD (Astrophysics)
Advisor: Prof. D. Hatzidimitriou; dh@physics.uoc.gr
Thesis: *The X-ray source population of the Small Magellanic Cloud*

University of Crete, Greece July 2004
Degree awarded: MSc (Graduate Diploma with Specialization in Astrophysics)

University of Crete, Greece November 2002
Degree awarded: BSc (Physics)
Advisor: Prof. D. Hatzidimitriou; dh@physics.uoc.gr
Dissertation: *Photometric Study of the Galactic Globular Cluster NGC 6779*

RESEARCH EXPERIENCE **Smithsonian Astrophysical Observatory** February 2004 – August 2007
Visiting graduate student
Advisor: Dr. A. Zezas; azezas@cfa.harvard.edu

FUNDING PROPOSALS **Title:** Understanding The Youngest X-ray Binary Populations In Low Metallicities
(*P.I.: V. Antoniou*)
Agency: NASA - Astrophysics Data Analysis Program (ADAP)

Duration: 06/01/2010 – 05/31/2013 **Effort:** 12 Person-Months Per Year

Funds: \$322,128

Notes: Supported research on the formation and evolution of X-ray binaries (study the effects of age, metallicity, star-formation rate on young accreting binary populations in the nearest star-forming galaxies) and computation of X-ray binary models

Title: The deepest census of extragalactic stellar and accreting populations ever
(*P.I.: V. Antoniou*)

Agency: Chandra X-ray Observatory - Archive Proposal (Cycle 15)

Duration: 01/01/2014 – 12/31/2014 **Effort:** 12 Person-Months Per Year

Funds: \$78,000

Notes: Supported research on archival Chandra ACIS-I and ACIS-S observations of the area of the Supernova Remnant E0102-72.3 in the SMC

AWARDS American Astronomical Society International Travel Grant June 2015, September 2013,
March 2012, September 2011,
September 2010

INTERNATIONAL **Summer School in Statistics for Astronomers IV** June 9-14, 2008
SCHOOLS Organized by Penn State University; Held in State College, PA

4th International X-ray Astronomy School August 15 -19, 2005
Organized by NASA Goddard Space Flight Center & Chandra X-ray Observatory Center; Held
in Cambridge, MA

13th & 14th Advanced Physics Summer School July 2001 & July 2002
Astronomy courses – Organized by University of Crete, Department of Physics and Foundation
of Research & Technology Hellas (FORTH); Held in Heraklio, Greece

OBSERVING ◇ 6.5m Magellan-Baade telescope at Las Campanas Observatory, Chile (IMACS; imaging)
EXPERIENCE ◇ 4.2m William Herschel Telescope at Roque de Los Muchachos Observatory, La Palma, Spain
(AF2/WYFFOS; spectroscopy)
◇ 4m V. M. Blanco telescope at CTIO, Chile (Mosaic II; imaging)
◇ 2.2m MPG/ESO telescope at La Silla Observatory, Chile (WFI; imaging)
◇ 1.5m (60") telescope at FLWO, Mt. Hopkins, AZ (FAST; spectroscopy)
◇ 1.3m telescope at Skinakas Observatory, Crete, Greece (imaging)

DATA ANALYSIS **X-rays**
EXPERIENCE Extensive experience in the analysis of observations obtained with the *Chandra* and *XMM-Newton*
satellites. Limited experience on the reduction of *Swift* data. Used in the study of:

- ◇ X-ray source populations in nearby star-forming and starburst galaxies
 - Properties of the overall accreting X-ray binary population
 - Relative contribution of the various components
 - Formation and evolution of high-mass X-ray binaries
 - Effect of metallicity and post-starburst age on their formation and evolution
 - Dependence of the X-ray luminosity function on these parameters

Optical

Extensive experience in optical imaging and spectroscopy. Very good knowledge of the IRAF data analysis package. Used for the investigation of the properties of:

- ◇ Globular clusters
 - Reddening, metallicity and age of the most metal-poor and oldest globular clusters in the Galactic halo

to characterize the hard X-ray properties of sources detected above 10 keV, identify the nature of individually detected X-ray sources (neutron star high-mass X-ray binaries vs. black hole candidates), look for short-term (hours to weeks) variability and establish a baseline for long-term variability studies (weeks to years).

Member of the Spitzer “SAGE-Spec” Science Team

PI: Ciska Kemper (Academia Sinica, Institute of Astronomy and Astrophysics)

SAGE-Spec is a legacy project using the *Spitzer Space Telescope*. It leverages the SAGE-LMC program by conducting a comprehensive IRS and MIPS SED spectroscopy program of dust with the goal to determine the composition, origin, evolution, and observational characteristics of interstellar dust and its role in the LMC.

Member of the “X-ray Deep: Studying the Universe in X-rays” Science Working Group

PI: Ann Hornschemeier (NASA/GSFC)

This X-ray Astrophysics group, based at NASA Goddard Space Flight Center, works on galaxy evolution, X-ray binary populations, and AGN evolution. The research mainly concerns accretion processes in binary systems as well as the general properties of galaxies (star-formation rates, stellar masses, etc.), and centers on assembling uniform datasets (both X-ray and multi-wavelength) that permit robust observational tests of the known X-ray binary scaling correlations. In addition, the group is very interested in the connection between AGN and galaxy evolution, lower-luminosity AGN, and highly obscured AGN.

Member of the Athena “Star formation and evolution” Science Working Group 3.2

co-chairs: A. Hornschemeier, G. Rauw and S. Scioritino

At the June 2014 meeting of ESA’s Science Programme Committee, Athena was selected as the mission for the 2nd Large mission opportunity, satisfying the Cosmic Vision theme the “Hot and Energetic Universe”. Science Working Group 3.2 forms part of the Athena “Observatory” Science Working Group 3, co-chaired by A. Decourchelle, H. Matsumoto and R. Smith.

APPROVED
OBSERVING
PROPOSALS

Optical

- “Insights into High-Mass X-ray Binaries: Classification of sources in a Chandra X-ray Visionary Program” (Science P.I.)
 - 1.5 hours imaging (service time) at the 8.2m VLT UT3 telescope (VIMOS spectr.; 2014B/2015B; P.I. A. Manousakis)
 - 35 hours spectroscopy (service time) at the 8.2m VLT UT3 telescope (VIMOS spectr.; 2014B/2015B; P.I. A. Manousakis)
- “Classification of X-ray sources detected in the XMM-Newton survey of the SMC” (P.I.)
 - 6 hours (service time through NOAO exchange program) at the Anglo-Australian Telescope (2dF spectrograph; 2012B)
 - 5.5 hours (service time) at the Anglo-Australian Telescope (2dF spectrograph; 2010B)
- “Characterizing the faint X-ray source population of the Small Magellanic Cloud” (P.I.)
 - 2 nights at the 4m Blanco telescope, CTIO (Mosaic II camera; 2011B)
- “Characterizing the faint X-ray source population of the Small Magellanic Cloud” (Science P.I.)
 - 3 nights at the 2.2m MPG/ESO telescope, La Silla (WFI camera; 2011B; P.I. F. Haberl)
- “Unveiling the nature of young X-ray binaries in the Large Magellanic Cloud” (P.I.)
 - 5.8 hours (service time) at the Anglo-Australian Telescope (2dF spectrograph; 2010B)
- “Counting the X-ray binaries of the Small Magellanic Cloud” (P.I.)
 - 15 hours (service time) at the Gemini South Telescope (GMOS-S spectrograph; 2010B)
- “Optical spectroscopy of X-ray sources in the Small Magellanic Cloud” (co-I/P.I.)
 - 12 hours (service time) at the Anglo-Australian Telescope (2dF spectrograph; 6 hours obser-

vations in each of the observing periods 2004B (co-I; P.I. A. Zezas) & 2008B (P.I.)

- “X-ray binaries and stellar populations in the Small Magellanic Cloud” (co-I)
1 night at the 6.5m Magellan Baade telescope, Las Campanas (IMACS camera; 2004B; P.I. A. Zezas)

X-rays

- “0.5–30 keV monitoring of the M31 disk with *Chandra* and *NuSTAR*” (co-I)
25 ks observations with the *Chandra* X-ray Observatory (Cycle 17; P.I. A. Hornschemeier)
- “Monitoring the X-ray binary populations of M31 with *NuSTAR*” (co-I)
300 ks observations with the *NuSTAR* X-ray Telescope (Cycle 1; P.I. A. Hornschemeier)
- “Binaries in the M31 bulge: a hard X-ray view of old stellar populations” (co-I)
100 ks observations with the *NuSTAR* X-ray Telescope (Cycle 1; P.I. M. Yukita)
- “A hard X-ray view of Andromeda (M31): Coordinated *XMM-Newton*/*NuSTAR* observations of X-ray binaries from 0.5-30 keV” (co-I)
35 ks observations with the *XMM-Newton* X-ray Telescope (AO-14; P.I. A. Hornschemeier)
- “A *Chandra* Legacy Survey of the disk of M31” (co-I)
350 ks observations with the *Chandra* X-ray Observatory (Cycle 16; P.I. B. Williams)
- “The SMC – A case study of X-ray source populations at low metallicity” (co-I)
1.1 Ms observations with the *Chandra* X-ray Observatory (Cycle 14; P.I. A. Zezas)
- “The X-ray source populations of different stellar generations in the LMC” (P.I.)
66 ks, 33 ks & 33 ks observations with the *XMM-Newton* X-ray Observatory (AO-9, AO-10 & AO-11)
- “The X-ray source population of different stellar generations in the SMC” (co-I)
137.4 ks & 46 ks observations with the *XMM-Newton* X-ray Observatory (AO-4 & AO-6; P.I. A. Zezas)

PEER REVIEWED JOURNAL ARTICLES

1. Hong, J., **Antoniou, V.**, Zezas, A. *et al.* 2016, *SXP214, an X-ray pulsar in the Small Magellanic Cloud, crossing the circumstellar disk of the companion*, ApJ submitted
2. Yukita, M., Hornschemeier, A. E., Lehmer, B. D., Ptak, A., Wik, D. R., Zezas, A., **Antoniou, V.** *et al.* 2016, *A Hard X-ray Study of the Normal Star-Forming Galaxy M83 with NuSTAR*, ApJ accepted (arXiv:1604.07441)
3. **Antoniou, V.** & Zezas, A. 2016, *Star-Formation History and X-ray Binary Populations: The Case of the Large Magellanic Cloud*, MNRAS, 459, 528
4. Maccarone, T. J., Yukita, M., Hornschemeier, A. E., Lehmer, B. D., **Antoniou, V.**, Ptak, A., *et al.* 2016, *Demonstrating the likely neutron star nature of four M31 globular cluster sources with Swift-NuSTAR spectroscopy*, MNRAS, 458, 3633
5. Ruffle, P. M. E., Kemper, F., Jones, O. C., Sloan, G. C., Kraemer, K. E., Woods, P. M., Boyer, M. L., Srinivasan, S., **Antoniou, V.** *et al.* 2015, *Spitzer Infrared Spectrograph point source classification in the Small Magellanic Cloud*, MNRAS, 451, 3504
6. Lehmer, B. D., Tyler, J. B., Wik, D. R., Yukita, M., Hornschemeier, A. E., **Antoniou, V.** *et al.* 2015, *The 0.3-30 keV spectra of powerful starburst galaxies: NuSTAR and Chandra observations of NGC 3256 and NGC 3310*, ApJ, 806, 126
7. Ptak, A., Hornschemeier, A., Zezas, A., Lehmer, B., Yukita, M., Wik, D. R., **Antoniou, V.** *et al.* 2015, *A focused, hard X-ray look at Arp 299 with NuSTAR*, ApJ, 800, 104
8. Wik, D. R., Lehmer, B., Hornschemeier, A., Yukita, M., Ptak, A., Zezas, A., **Antoniou, V.** *et*

al. 2014, *Spatially resolving a starburst galaxy at hard X-ray energies: NuSTAR, Chandra, and VLBA observations of NGC 253*, ApJ, 797, 79

9. Maccarone, T. J., Lehmer, B. D., Leyder, J. C., **Antoniu, V.** *et al.* 2014, *A new candidate Wolf-Rayet X-ray binary in NGC 253*, MNRAS, 439, 3064
10. Maravelias, G., Zezas, A., **Antoniu, V.** & Hatzidimitriou, D. 2014, *Optical spectra of five new Be/X-ray binaries in the Small Magellanic Cloud and the link of the supergiant B[e] star LHA 115-S 18 with an X-ray source*, MNRAS, 438, 2005
11. Lehmer, B. D., Wik, D. R., Hornschemeier, A. E., Ptak, A., **Antoniu, V.** *et al.* 2013, *NuSTAR and Chandra insight into the nature of the 3–40 keV nuclear emission in NGC 253*, ApJ, 771, 134
12. Woods, P. M., Oliveira, J. M., Kemper, F. *et al.* 2011, *The SAGE-Spec Spitzer Legacy program: The life-cycle of dust and gas in the Large Magellanic Cloud. Point source classification I*, MNRAS, 411, 1597
13. **Antoniu, V.**, Zezas, A., Hatzidimitriou, D. & Kalogera, V. 2010, *Star Formation History and X-ray Binary Populations: The Case of the Small Magellanic Cloud*, ApJL, 716, 140
This work is cited on the 2012 Senior Review of “XMM-Newton Guest Observer Facility, Guest Observer Funding, US RGS Team, and XMM-Newton Education and Public Outreach” (available from here:
ftp://legacy.gsfc.nasa.gov/xmm/doc/senior_review/xmm_sr.science_2012.pdf)
14. Laycock, S., Zezas, A., Hong, J., Drake, J. J., **Antoniu, V.** 2010, *Exploring the Small Magellanic Cloud to the Faintest X-ray Fluxes: Source Catalog, Timing, and Spectral Analysis*, ApJ, 716, 1217
15. Kemper, F., Woods, P. M., **Antoniu, V.** *et al.* 2010, *The SAGE-Spec Spitzer Legacy Program: The Life Cycle of Dust and Gas in the Large Magellanic Cloud*, PASP, 122, 683
16. **Antoniu, V.**, Hatzidimitriou, D., Zezas, A., & Reig, P. 2009, *Optical spectroscopy of 20 Be/X-ray Binaries in the Small Magellanic Cloud*, ApJ, 707, 1080
17. **Antoniu, V.**, Zezas, A., Hatzidimitriou, D. & McDowell, J. 2009, *The Chandra survey of the SMC “Bar”: II. Optical counterparts of X-ray sources*, ApJ, 697, 1695
18. Hatzidimitriou, D., **Antoniu, V.**, Papadakis, I., Kaltsa, M., Papadaki, C., Papamastorakis, I., & Croke, B.F.W. 2004, *BVRI photometry of the galactic globular cluster NGC 6779*, MNRAS, 348, 1157

PROCEEDINGS
ARTICLES

19. **Antoniu, V.**, Zezas, A. & Hatzidimitriou, D., Kalogera, V., *Small Magellanic Cloud: Star-Formation History and X-Ray Binary Populations*, Proceedings article for “the 9th International Conference of the Hellenic Astronomical Society”, Edited by Kanaris Tsinganos, Despina Hatzidimitriou, and Titos Matsakos, San Francisco: Astronomical Society of the Pacific, p. 230 (2010)
20. **Antoniu, V.**, Zezas, A., Hatzidimitriou, D. & Kalogera, V., *Star-Formation History and Young X-ray Binary Populations: The Case of the Small Magellanic Cloud*, Proceedings of the “Chandra’s First Decade of Discovery”, Edited by Scott Wolk, Antonella Fruscione, and Douglas Swartz, Boston, MA (2009)
21. Zezas, A., **Antoniu, V.**, Gazeas, K., Sell, P., Fabbiano, G., Kalogera, V. & Pooley, D., *X-ray source populations in nearby spiral and star-forming galaxies*, Proceedings of the “Chandra’s First Decade of Discovery”, Edited by Scott Wolk, Antonella Fruscione, and Douglas Swartz, Boston, MA (2009)
22. **Antoniu, V.**, Zezas, A. & Hatzidimitriou, D., *A comprehensive study of the link between star-*

formation history and X-ray source populations in the SMC, Proceedings article for the IAU Symposium 256 “The Magellanic System: Stars, Gas, and Galaxies”, Edited by Jacco Th. van Loon & Joana M. Oliveira, Vol. 4, pp. 355-360, Cambridge: Cambridge University Press (2009)

23. **Antoniu, V.**, Zezas, A. & Hatzidimitriou, D., *Study of the Faint End of the X-ray Source Populations in the Small Magellanic Cloud*, Proceedings article for the conference “A Population Explosion: The Nature and Evolution of X-ray Binaries in Diverse Environments”, AIP Conference Proceedings, Volume 1010, pp. 320-324 (2008)

24. **Antoniu, V.**, Zezas, A. & Hatzidimitriou, D., *Studies of the faint X-ray source population in the Small Magellanic Cloud*, Proceedings of ESAC faculty workshop on “X-rays from Nearby Galaxies”, MPE Report 295, ISSN 0178-0719, pp. 38-41 (2008)

TELEGRAMS

25. Blondin, S., Modjaz, M., Kirshner, R., Challis, P., Matheson, T., **Antoniu, V.**, *Supernova 2006bb in UGC 4468*, Central Bureau for Astronomical Telegrams, 461, 1; edited by Green, D. W. E. (2006)

26. Blondin, S., Modjaz, M., Kirshner, R., Challis, P., **Antoniu, V.**, *Supernova 2006ba in NGC 2980*, Central Bureau for Astronomical Telegrams, 458, 1; edited by Green, D. W. E. (2006)

SELECTED
PRESENTATIONS

Contributed Talks & Seminars

- ◇ “*The young X-ray binary populations in our backyard*”, Oct. 2015, Chandra X-ray Center – Smithsonian Astrophysical Observatory, Cambridge, MA (seminar)
- ◇ “*First results from the 1.1 Ms Chandra X-ray Visionary Program of the Small Magellanic Cloud*”, June 2015, 12th Hellenic Astronomical Conference, Thessaloniki, Greece (talk)
- ◇ “*A deep Chandra survey of one of the nearest star-forming low-metallicity galaxies: First results*”, Aug. 2014, 14th HEAD AAS Meeting, Chicago, IL (talk)
- ◇ “*A Chandra X-ray Visionary Program of a low-metallicity star-forming galaxy: First results*”, July 2014, X-ray View of Galaxy Ecosystems, Boston, MA (talk)
- ◇ “*Insights into the High-Mass X-ray Binary Population of the Magellanic Clouds*”, Sept 2013, 11th Hellenic Astronomical Conference, Athens, Greece (talk)
- ◇ “*The missing piece of the puzzle: Neutron stars accreting from supergiant companions*”, Sept. 2012, Half a century of X-ray astronomy, Mykonos, Greece (talk)
- ◇ “*Constraining the formation and evolution of young X-ray binaries in the nearest star-forming galaxies*”, Jan. 2012, 219th AAS meeting, Austin, TX (talk)
- ◇ “*Constraining the formation and evolution of young X-ray binaries in the nearest star-forming galaxies*”, Nov. 2011, ESO Offices, Santiago, Chile (seminar)
- ◇ “*Connecting the young accreting binary population of the Magellanic Clouds with their star-formation history*”, Sept. 2011, 10th Hellenic Astronomical Conference, Ioannina, Greece (talk)
- ◇ “*Connecting the young accreting binary population of the Magellanic Clouds with their star-formation history*”, July 2011, BeXRB 2011, Valencia, Spain (talk)
- ◇ “*Young X-ray binary populations in low metallicity star-forming galaxies*”, Sept. 2010, High Energy View of Accreting Objects: AGN and XRBs, Agios Nikolaos, Crete, Greece (talk)
- ◇ “*Probing the link between star-formation history and young X-ray binary populations: The case of the Small Magellanic Cloud*”, Aug. 2009, Physics & Astronomy Dept., Iowa State University, Ames, IA (seminar)
- ◇ “*Probing the link between star-formation history and young X-ray binary populations: The case of*

the Small Magellanic Cloud”, Apr. 2009, High Energy Astrophysics Division, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA (seminar)

- ◇ “*A comprehensive study of the link between star-formation history and X-ray source populations in the SMC*”, July 2008, IAU Symposium 256, The Magellanic System: Stars, Gas, and Galaxies, Keele, UK (talk)
- ◇ “*Study of the faint end of the X-ray source populations in the Small Magellanic Cloud*”, Oct. 2007, A Population Explosion: The Nature and Evolution of X-ray Binaries in Diverse Environments, St. Petersburg Beach, FL (talk)
- ◇ “*Studies of the faint end of the X-ray source population in the Small Magellanic Cloud*”, Sept. 2007, 8th Hellenic Astronomical Conference, Thassos, Greece (talk)
- ◇ “*Studies of the faint end of the X-ray source population in the Small Magellanic Cloud*”, Sept. 2007, X-rays from Nearby Galaxies, ESAC, Villafranca del Castillo, Madrid, Spain (talk)
- ◇ “*A Chandra survey of the Small Magellanic Cloud: Optical counterparts of X-ray sources*”, May 2007, AAS 210th Meeting, Honolulu, HI (talk)

Posters

- ◇ “*The link between young X-ray binaries and star formation in our nearest low-metallicity star-forming galaxy*”, June 2015, 12th Hellenic Astronomical Conference, Thessaloniki, Greece
- ◇ “*Understanding young X-ray binaries in the Small Magellanic Cloud*”, Nov. 2014, 15 Years of Science with Chandra Symposium, Boston, MA
- ◇ “*A deep X-ray view of the Small Magellanic Cloud*”, June 2014, AAS 224th meeting, Boston, MA
- ◇ “*High-Mass X-ray Binaries in our Backyard: Studying Their Formation and Evolution in the Magellanic Clouds*”, Apr. 2013, HEAD 13th meeting, Monterey, CA
- ◇ “*Optical spectroscopy of High-Mass X-ray Binaries in the Small Magellanic Cloud*”, July 2012, X-ray binaries: Celebrating 50 years since the discovery of Sco X-1, Cambridge, MA
- ◇ “*Young X-ray binary populations in low metallicity star-forming galaxies*”, June 2011, The X-ray Universe 2011, Berlin, Germany
- ◇ “*Young X-ray binary populations in low metallicity star-forming galaxies*”, May 2011, Twelve Years of Science with Chandra & AAS 218th meeting, Cambridge, MA
- ◇ “*Understanding the youngest X-ray binary populations in low metallicities*”, Mar. 2010, HEAD 11th meeting, Big Island, HI
- ◇ “*Exploring the Small Magellanic Cloud to the faintest X-ray fluxes*”, Mar. 2010, HEAD 11th meeting, Big Island, HI
- ◇ “*Optical counterparts of X-ray sources in the Small Magellanic Cloud*”, Nov. 2005, Six Years of Science with Chandra, Symposium dedicated to Leon Van Speybroeck, Cambridge, MA
- ◇ “*Optical counterparts of X-ray sources in the Small Magellanic Cloud*”, Sept. 2005, 7th Hellenic Astronomical Conference, Kefalonia, Greece
- ◇ “*Optical counterparts of X-ray sources in the Small Magellanic Cloud*”, July 2004, Galaxies Viewed with Chandra Workshop, Cambridge, MA

REFERENCES

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Additional references are available upon request.