

## MICHAEL J. NEWCHURCH

### Curriculum Vitae

Atmospheric Science Department  
University of Alabama in Huntsville  
National Space Science and Technology Center

#### PROFESSIONAL PREPARATION

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**Ph.D.** Atmospheric Sciences, Georgia Institute of Technology, 1986  
**B.S.** Industrial Sciences, Colorado State University, 1974

#### APPOINTMENTS

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**2007-present** CEO, Air-Quality Remote-Sensing Consulting, LLC  
**2005-present** Professor, Atmospheric Science Dept., UAH  
**2000-2005** Associate Professor, Atmospheric Science Dept., UAH  
**1994-2000** Associate Research Professor, Atmospheric Science Dept., UAH  
**1991-present** Senior Research Scientist, Earth System Science Ctr., UAH  
**1988-1994** Adjunct Asst. Professor, Atmospheric Science Dept, UAH  
**1999-2002** Affiliate Scientist, Atmospheric Chem Div., National Ctr. Atmospheric Research  
**1998** Visiting Scientist, Atmospheric Chem Div., National Ctr. Atmospheric Research  
**1991-1993** Senior Atmospheric Scientist, Teledyne Brown Engineering, Huntsville, AL  
**1988-1990** Mgr, Geo. Remote-Sensing Section, Teledyne Brown Engineering, Huntsville, AL  
**1986-1988** Atmospheric Scientist, Teledyne Brown Engineering, Huntsville, AL

#### RESEARCH SUMMARY

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- *Atmospheric Chemistry*: PI: Tropospheric Ozone Lidar Network, TOLNet.
- *Lidar*: Measured ozone profiles with UV DIAL, aerosol profiles with elastic backscatter, wind and aerosol profiles with coherent Doppler wind and aerosol lidar in the RAPCD laboratory. Founding member and PI of the Tropospheric Ozone Lidar Network, TOLNet. Member of Network for Detection of Atmospheric Composition Change, NDACC.
- *Laser Propagation*: Modeled the effects of optical systems (lasers, retroreflectors) and atmospheric properties (refraction, turbulence, scattering, absorption) on laser beam propagation over arbitrary slant ranges, especially between ground-based and satellite-based systems.
- *Satellite Remote Sensing*: Retrieved and validated trace gases (ozone, NO<sub>2</sub>, halogens et al.) and aerosol concentrations from numerous satellite (TEMPO, OMPS, OMI, TOMS, SAGE, HALOE, AIRS, ATMOS, POAM, and SBUV) instruments and ground-based (Dobson, Brewer, Umkehr, ozonesonde) systems.

- *Trend Analyses*: Reported the first stage of recovery of the stratospheric ozone layer and quantified the degree and significance of ozone recovery in the upper and lower stratosphere in mid-latitudes, high southern latitudes, and in the Antarctic ozone hole.
- *Trace Gas Measurements*: Supervised the design and implementation of an extractive cryocooled inert preconcentration instrument with FTIR spectroscopy for autonomous measurements of atmospheric organics.

## PROFESSIONAL ACTIVITIES

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- \$12.9 M total research sponsored by NASA, NOAA, NSF, DOE, NRL, EPA, DOD.
- PI: Tropospheric Ozone Lidar Network (TOLNet).
- Scientific Director: Regional Atmospheric Profiling Center for Discovery, RAPCD, 2002-present.
- Scientific Director, Huntsville Ozone Sonde Station, 1999-present.
- Science Team Memberships: TEMPO, GEO-CAPE, NPP, OMI, AIRS, SAGE I,II,&III, TOMS, ATLAS, ATMOS, POAM.
- Co-Author, WMO 2006 Ozone Assessment.
- Sigma Xi Researcher of the Year 2004, UAH Chapter.
- Invited plenary lecturer to Quadrennial Ozone Symposium (2004), American Geophysical Union (2003), and Gordon Research Conference on Atmospheric Chemistry (2003).
- Member, External Advisory Board, NOAA Cooperative Remote Sensing Science and Technology Center, 2002-present.
- Member, NASA Space Station Utilization Advisory Subcommittee (SSUAS) 1999-2003.
- Advisor to NASA Earth Science Research Director reviewing South Korean National Atmospheric Science Research program (1998).
- Invited to International Ozone Commission Trends Panel (1998).
- Assistant Mission Scientist, ATLAS-2 (1993) and ATLAS-3 (1994).
- NASA Group Achievement Award for ATLAS-2 (1993), ATLAS-3 mission (1994), ICARTT (2005).
- Taught 8 undergraduate and 25 graduate courses at UAH.
- Developed Atmospheric Chemistry graduate curriculum at UAH.
- Advisor to 28 undergraduate students, 16 graduate students, 2 Post-docs, 4 MS degrees, and 7 PhDs.
- Reviewer of papers submitted to the *Atmospheric Environment*, *Journal of Geophysical Research*, *Geophysical Research Letters*, *Journal of Atmospheric Chemistry*, *Journal of Atmospheric Chemistry and Physics*, and *Ocean-Atmospheres*.
- Reviewer of proposals submitted to NASA, NSF, and NSERC Canada.
- Member, Peer-review of LaRC's Atmospheric Composition within the Science Directorate (2008).

## PROFESSIONAL ORGANIZATIONS

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- American Geophysical Union (member 25 years)
- American Meteorological Society
- American Chemical Society
- American Academy for the Advancement of Science
- American Institute of Aeronautics and Astronautics
- Optical Society of America
- Sigma Xi

**PUBLICATIONS, M. J. NEWCHURCH**

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Many available at <http://nsstc.uah.edu/atmchem/>

105. Johnson, M. S., X. Liu, P. Zoogman, J. Sullivan, M. J. Newchurch, S. Kuang, T. Leblanc, T. McGee (2018), Evaluation of potential sources of a priori ozone profiles for TEMPO. *Atmos. Meas. Tech.*, 11, 3457-3477, <https://doi.org/10.5194/amt-11-3457-2018>.
104. Langford, A. O., Alvarez II, R. J., Brioude, J., Evan, S., Iraci, L. T., Kirgis, G., Kuang, S., Leblanc, T., Newchurch, M. J., Pierce, R. B., Senff, C. J., & Yates, E. L. (2018), Coordinated profiling of stratospheric intrusions and transported pollution by the Tropospheric Ozone Lidar Network (TOLNet) and NASA Alpha Jet experiment (AJAX): Observations and comparison to HYSPLIT, RAQMS, and FLEXPART, *Atmos. Environ.*, Volume 174, Pages 1-14.
103. De Young, R., W. Carrion, R. Ganoë, D. Pliutau, G. Gronoff, T. Berkoff and S. Kuang (2017), Langley mobile ozone lidar: ozone and aerosol atmospheric profiling for air quality research. *Appl. Opt.*, 56(3), 721-730.
102. Kuang, S., M. J. Newchurch, A. M. Thompson, R. M. Stauffer, B. J. Johnson, L. Wang (2017), Ozone Variability and Anomalies Observed during SENEX and SEAC<sup>4</sup>RS Campaigns in 2013, *J. Geophys. Res. Atmos.*, 122, 11227-11241. <https://doi.org/10.1002/2017JD027139>.
101. Wang, L., M. J. Newchurch, R. J. Alvarez II, T. A. Berkoff, S. S. Brown, W. Carrion, R. D. Young, B. J. Johnson, R. Ganoë, G. Gronoff, G. Kirgis, S. Kuang, A. O. Langford, T. Leblanc, E. E. McDuffie, T. J. McGee, D. Pliutau, C. J. Senff, J. T. Sullivan, G. Sumnicht, L. W. Twigg, A. J. Weinheimer, Quantifying TOLNet Ozone Lidar Accuracy during the 2014 DISCOVER-AQ and FRAPPÉ Campaigns, *Atmos. Meas. Tech.*, 10, 3865-3876, 2017, <https://doi.org/10.5194/amt-10-3865-2017>.
100. Travis, K. R., D. J. Jacob, C. A. Keller, S. Kuang, J. Lin, M. J. Newchurch, A. M. Thompson, Resolving Ozone Vertical gradients in Air Quality Models, *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2017-596>, in review, 2017.
99. Huang, G., X. Liu, K. Chance, K. Yang, P. Bhartia, Z. Cai, M. Allaart, G. Ancellet, B. Calpini, G. Coetzee, E. Cuevas, M. Cupeiro, H. Backer, M. K. Dubey, H. E. Fuelberg, M. Fujiwara, S. Godin-Beekmann, T. J. Hall, B. Johnson, M. Yela, ..., M. J. Newchurch, et al., (2017), Validation of 10-year SAO OMI Ozone Profile (PROFOZ) Product using Ozonesonde Observations, *Atmos. Meas. Tech.*, 10, doi: 10.5194/amt-10-2455-2017.
98. Reid, J. S., R. E. Kuehn, R. E. Holz, E. W. Eloranta, K. C. Kaku, S. Kuang, M. J. Newchurch, A. M. Thompson, C. R. Trepte, J. Zhang, S. A. Atwood, J. L. Hand, B. N. Holben, P. Minnis, D. J. Posselt, (2017), Ground based high spectral resolution lidar observation of aerosol vertical distribution in the summertime Southeast United States: Aerosol vertical distribution, *J. Geophys. Res. Atmos.*, 122, 2970-3004, doi: 10.1002/2016JD025798.
97. Kuang, S., M. J. Newchurch, M. S. Johnson, L. Wang, J. Burris, R. B. Pierce, E. W. Eloranta, I. B. Pollack, M. Graus, J. de Gouw, C. Warneke, T. B. Ryerson, M. Z. Markovic, J. S. Holloway, A. Pour-Biazar, G. Huang, X. Liu, N. Feng, (2017), Summertime tropospheric ozone enhancement associated with a cold front passage due to stratosphere-to-troposphere transport and biomass burning:

- simultaneous ground-based lidar and airborne measurements, *J. Geophys. Res. Atmos.*, 122, 1293-1311, doi:10.1002/2016JD026078.
96. Zoogman P., X. Liu, R.M. Suleiman, W.F. Pennington, D.E. Flittner, J.A. Al-Saadi, B.B. Hilton, D.K. Nicks, M.J. Newchurch, J.L. Carr, S.J. Janz, M.R. Andraschko, A. Arola, B.D. Baker, B.P. Canova, C. Chan Miller, R.C. Cohen, J.E. Davis, M.E. Dussault, D.P. Edwards, J. Fishman, A. Ghulam, G. Gonzalez Abad, M. Grutter, J.R. Herman, J. Houck, D.J. Jacob, J. Joiner, B.J. Kerridge, J. Kim, N.A. Krotkov, L. Lamsal, C. Li, A. Lindfors, R.V. Martin, C.T. McElroy, C. McLinden, V. Natraj, D.O. Neil, C.R. Nowlan, P.I. Palmer, R.B. Pierce, M.R. Pippin, A. Saiz-Lopez, R.J.D. Spurr, J.J. Szykman, O. Torres, J.P. Veefkind, B. Veihelmann, H. Wang, J. Wang, and K. Chance (2017), Tropospheric emissions: monitoring of pollution (TEMPO), *Journal of Quantitative Spectroscopy and Radiative Transfer*, 186, 17-39.
  95. Huang G., X. Liu, K. Chance, K. Yang, P. K. Bhartia, Z. Cai, M. Allaart, B. Calpini, G. J. R. Coetzee, E. Cuevas-Agullo, M. Cupeiro, ..., M. J. Newchurch, etc., (2017), Validation of 10-year SAO OMI Ozone Profile (PROFOZ) Product Using Ozone Sonde Observations, *Atmospheric Measurement Techniques Discussions*, doi:10.5194/amt-2017-15.
  94. Johnson, M., S. Kuang, L. Wang, and M.J. Newchurch (2016), Evaluating Summer-Time Ozone Enhancement Events in the Southeast United States, *Atmosphere*, 7(8), 108, doi:10.2290/atmos7080108.
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  92. Buckley, P.I., D.A. Bowdle, M.J. Newchurch, B.C. Sive, and G. H. Mount. 2015. "Extractive FTIR spectroscopy with cryogen-free low temperature inert preconcentration for autonomous measurements of atmospheric organics: 1: Instrument development and preliminary performance." *Applied Optics* 54(10): 2908-2921. doi: 10.1364/AO.54.002908.
  91. Huang, G., M.J. Newchurch, S. Kuang, P.I. Buckley, W. Cantrell, and L. Wang. 2015. "Definition and determination of ozone laminae using Continuous Wavelet Transform (CWT) analysis" *Atmospheric Environment* 104: 125-131. doi:10.1016/j.atmosenv.2014.12.027.
  90. Koshak, W., H. Peterson, A. Biazar, M. Khan, and L. Wang. 2014. "The NASA Lightning Nitrogen Oxides Model (LNOM): Application to air quality modeling." *Atmospheric Research* 135-136: 363-369. doi: 10.1016/j.atmosres.2012.12.015.
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  88. Kuang, S., M.J. Newchurch, J. Burris, and X. Liu. 2013. "Ground-based lidar for atmospheric boundary layer ozone measurements." *Applied Optics* 52(15): 3557-3566. <http://dx.doi.org/10.1364/AO.52.003557>.

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82. Kuang, S., M.J. Newchurch, J. Burris, L. Wang, P.I. Buckley, S. Johnson, K. Knupp, G. Huang, D. Phillips, and W. Cantrell. 2011. "Nocturnal ozone enhancement in the lower troposphere observed by lidar." *Atmospheric Environment* 49(33): 6078-6084. doi:10.1016/j.atmosenv.2011.07.038.
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- United States: Variability and trends." *Atmospheric Chemistry and Physics* 11: 567-582. doi:10.5194/acp-11-567-2011.
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68. Thompson, A.M., J.B. Stone, J.C. Witte, S.K. Miller, R.B. Pierce, R.B. Chatfield, S.J. Oltmans, O.R. Cooper, A.L. Loucks, B.F. Taubman, B.J. Johnson, E. Joseph, T.L. Kucsera, J.T. Merrill, G.A. Morris, S. Hersey, G. Forbes, M.J. Newchurch, F.J. Schmidlin, D.W. Tarasick, V. Thouret, and J-P. Cammas. 2007. "Intercontinental Chemical Transport Experiment Ozonesonde Network Study (IONS) 2004: 1. Summertime upper troposphere/lower stratosphere ozone over northeastern North America." *Journal of Geophysical Research* 112(12): D12S12. doi:10.1029/2006JD007441.

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- stratospheric ozone.” *Journal of Geophysical Research* 111(17): D17309. doi:10.1029/2005JD006371.
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  51. Newchurch, M. J. (1999), Umkehr Ozone Validation Considerations, Umkehr Review Meeting, World Ozone and Ultraviolet Data Center, Toronto, Canada, 17 November.
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43. Newchurch, M. J., J. H. Kim (1998), Biomass-burning Influence on Tropical Tropospheric Ozone AGU Fall Meeting, San Francisco, CA, 8 December.
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35. Kim, J. H., M. J. Newchurch, R. D. Hudson, A. Thompson (1998), On the Derivation of Tropospheric Ozone from TOMS Measurements, *invited talk*, NCAR, Boulder, CO, 2 February.
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- GAW Conference on Global Measurement Systems for Atmospheric Composition, Toronto, Canada, 20-22 May.
27. Newchurch, M. J. (1996), 67 years of Dobson Umkehr Observations: An Overview, presented at SPARC/IOC Meeting on Trends in the Vertical Distribution of Ozone, Observatoire de Haute Provence Saint Michel l'Observatoire, France, 8-12 July.
  26. Newchurch, M. J., D. Cunnold, J. Cao (1996), Umkehr and SAGE Ozone Profile Comparisons, presented at SPARC/IOC Meeting on Trends in the Vertical Distribution of Ozone, Observatoire de Haute Provence Saint Michel l'Observatoire, France, 8-12 July.
  25. Newchurch, M. J., E. S. Yang (1996), Some Considerations in Deriving Umkehr Ozone Trends, presented at SPARC/IOC Meeting on Trends in the Vertical Distribution of Ozone, Observatoire de Haute Provence Saint Michel l'Observatoire, France, 8-12 July.
  24. Newchurch, M. J. (1996), Umkehr and SAGE ozone: retrieval and a priori differences at 15 stations, paper presented at NOAA/CMDL annual meeting, Boulder, CO, 6-7 March.
  23. Newchurch, M. J., D. M. Cunnold, M. Allen, B. M. Herman (1995), SAGE-Umkehr Ozone Profile Analyses, paper presented at DOE Atmospheric Chemistry Program Annual Meeting, Vienna, VA, 5-7 December.
  22. Abbas, M. J., H. A. Michelsen, M. R. Gunson, M. C. Abrams, M. J. Newchurch, A. Y. Chang, A. Goldman, F. W. Irion, G. L. Manney, E. J. Moyer, R. Nagaraju, C. P. Rinsland, R. J. Salawitch, G. P. Stiller, R. Zander (1995), Hydrogen Budget of the Stratosphere from ATMOS/ATLAS Measurements of Water Vapor and Methane, paper presented at AGU Fall Meeting, San Francisco, CA, 11-15 December.
  21. Abrams, M. C., M. R. Gunson, M. J. Newchurch (1995), ATMOS/ATLAS Observations of ozone and temperature in the middle atmosphere, paper presented at XXI General Assembly of IUGG, Boulder, CO, 2-14 July.
  20. Newchurch, M. J., D. M. Cunnold, M. Allen, B. Herman (1995), Old and new Umkehr ozone profiles compared to SAGE II: Measurements and radiative transfer calculations, paper presented at XXI General Assembly of IUGG, Boulder, CO, 2-14 July.
  19. Newchurch, M. J., D. M. Cunnold (1995), SAGE II and Umkehr ozone measurements in the lower stratosphere, paper presented at International Conference on Ozone in the Lower Stratosphere, Halkidiki, Greece, 15-20 May.
  18. Chang, A. Y., R. J. Salawitch, M. R. Gunson, H. A. Michelson, M. C. Abrams, C. P. Rinsland, R. Zander, M. J. Newchurch, M. M. Abbas, G. P. Stiller, F. W. Irion (1995), Lifetimes of atmospheric source gases inferred from ATMOS measurements, paper presented at 5th Annual Meeting on Atmospheric Effects of Aviation Project, Virginia Beach, VA, 23 – 28 April.
  17. Gunson, M. R., A. Y. Chang, H. A. Michelson, R. J. Salawitch, M. C. Abrams, C. P. Rinsland, R. Zander, M. J. Newchurch, M. M. Abbas, G. P. Stiller, F. W. Irion (1995), A comparison of ATMOS and ER-2 gas measurements during November 1994, paper presented at 5th Annual Meeting on Atmospheric Effects of Aviation Project, Virginia Beach, VA, 23 – 28 April.
  16. Newchurch, M. J. (1995), Comparisons of old and new Umkehr to SAGE II ozone profiles and some preliminary ATMOS results, paper presented at NOAA/CMDL annual meeting, Boulder, CO, 7-10 March.

15. Newchurch, M. J., D. M. Cunnold, M. Allen, B. M. Herman (1994), SAGE-Umkehr Ozone analyses and related research, paper presented at DOE Atmospheric Chemistry Program, Seattle, WA, 18-19 October.
14. Newchurch, M. J. (1994), Report to the SAGE II Science Team, paper presented at SAGE II Science Team Meeting, Langley Research Center, Hampton, VA, 16 June.
13. Newchurch, M. J., D. M. Cunnold, M. Allen, B. M. Herman (1994), SAGE-Umkehr Ozone analyses, paper presented at DOE Atmospheric Chemistry Program, Nashville, TN, 19-20 January.
12. Newchurch, M. J., M. Allen, R. Stachnik (1993), Stratospheric chlorine partitioning modeling with SL-3 ATMOS and Balloon Microwave Limb Sounding measurements, paper presented at AGU Fall Meeting, San Francisco, CA, 6-10 December.
11. Newchurch, M. J. (1993), Empirical and theoretical study of Umkehr ozone profiles and aerosol effects using SAGE II data, paper presented at SAGE II Science Team Meeting, Langley Research Center, Hampton, VA, 16-18 June.
10. Newchurch, M. J., D. M. Cunnold (1992), SAGE II-Umkehr case study of ozone differences and aerosol effects from October 1984 to April 1989, paper presented at Quadrennial Ozone Symposium, Charlottesville, VA, 8-11 June.
9. Newchurch, M. J., G. P. Kubic, V. L. Griffin, J. Piccirillo (1991), Visible Earthlimb Radiance Profiles, paper presented at Midcourse Phenomenology Symposium, Huntsville, AL, 6-8 August.
8. Newchurch, M. J., D. M. Cunnold (1990), Comparison of SAGE II and Umkehr ozone profiles as functions of stratospheric optical depth, total ozone, season, and tropopause height, paper presented at the Topical Meeting on Optical Remote Sensing of the Atmosphere, Optical Society of America, Lake Tahoe, NV, 11-16 February.
7. Griffin, V. L., M. J. Newchurch (1990), A comparison of AVHRR radiances with airborne radiometer measurements, paper presented at the Topical Meeting on Optical Remote Sensing of the Atmosphere, Optical Society of America, Lake Tahoe, NV, 11-16 February.
6. Schmidt, E. O., M. J. Newchurch (1990), Analysis of radiometric knees using LOWTRAN, paper presented at Cloud Impacts on DoD Operations and Systems 1989/90, Monterey, California, 8-12 January.
5. Griffin, V. L., M. J. Newchurch (1990), A comparison of AVHRR radiances with airborne radiometer measurements, paper presented at Cloud Impacts on DoD Operations and Systems 1989/90, Monterey, California, 8-12 January.
4. Newchurch, M. J., V. L. Griffin, J. S. Gothart (1988), Climatology and characterization of tropical cirrus cloud radiometric properties, paper presented Cloud Impacts on DoD Operations and Systems, NSWC, White Oak, MD, 18-20 October.
3. Griffin, V. L., M. J. Newchurch (1988), Geophysical database for Thrusted Vector program, Cloud Impacts on DoD Operations and Systems, NSWC, White Oak, MD, 18-20 October.
2. Newchurch, M. J., G. W. Grams, D. M. Cunnold, J. J. DeLuisi (1988), A comparison of SAGE I and Umkehr ozone profiles including a search for Umkehr aerosol effects, paper presented at Quadrennial Ozone Symposium, Gottingen, Federal Republic of Germany, 8-13 August.

1. Newchurch, M. J., (1988) Geophysical Database for SDI (Classified), paper presented Passive Optical Signatures Symposium, Huntsville, Alabama, 10-12 May.

## PROPOSAL AWARD HISTORY

| Proposal Award History |           |            |                        |  |                       |               |           |
|------------------------|-----------|------------|------------------------|--|-----------------------|---------------|-----------|
| Contract               | Account # | Proposal # | PI                     | Title  | POP                   | Sponsor       | Net Award |
| N/A                    | N/A       | 1991-474   | Dr. Mike Newchurch, PI | Research Plan for Use of Atlas Data                                    | 7/25/1991             | NASA MSFC     | \$50,000  |
| N/A                    | N/A       | 1992-417   | Dr. Mike Newchurch, PI | Refine Research Plan for Use of Atmospheric Laboratory for Application | 5/28/1992             | NASA MSFC     | \$65,000  |
| NAS8-38609             | 5-33306   | 1993-405   | Dr. Mike Newchurch, PI | Stratospheric Chemistry Research                                       | 8/1/1993 - 7/30/1995  | ESSC MSFC     | \$65,876  |
| NAS8-38609             | 5-33307   | 1993-405   | Dr. Mike Newchurch, PI | Stratospheric Chemistry Research                                       | 8/1/1993 - 7/30/1995  | ESSC MSFC     | \$19,124  |
| NCC8-22                | 5-33432   | N/A        | Dr. Mike Newchurch, PI | ATLAS Atmospheric Chemistry  | 9/1/1993 - 9/30/1997  | ESSC MSFC     | \$116,343 |
| DE-FG05-93ER61730      | 5-33374   | 1993-285   | Dr. Mike Newchurch, PI | SAGE II Umkehr Ozone Comparisons                                       | 9/15/1993 - 9/14/1997 | ESSC DOE      | \$495,739 |
| 959894                 | 5-33504   | 1981-712   | Dr. Mike Newchurch, PI | Atmospheric Trace Molecular Spectroscopy                               | 9/15/1993 - 9/14/1997 | ESSC JPL      | \$183,000 |
| N/A                    | N/A       | 1994-455   | Dr. Mike Newchurch, PI | ATLAS Stratospheric Chemistry Research                                 | 5/19/1994             | NASA MSFC     | \$85,000  |
| N00014-94-1-G034       | 5-33679   | 1994-287   | Dr. Mike Newchurch, PI | Chemical Modeling of Stratospheric. Chlorine                           | 9/30/1994 - 9/29/1997 | ESSC NAVY/NRL | \$50,000  |
| NAGW-4681              | 5-33946   | 1995-605   | Dr. Mike Newchurch, PI | Validation of the Tropospheric Ozone Residual                          | 9/1/1995 - 12/31/1995 | ESSC NASA HQ  | \$20,000  |
| NAG1-1842              | 5-34494   | 1995-540   | Dr. Mike Newchurch, PI | Station-to-Station Ozone Variability                                   | 7/1/1996 - 6/30/2000  | ESSC LARC     | \$238,928 |
| NAG1-1898              | 5-34681   | 1996-578   | Dr. Mike Newchurch, PI | SAGE II NO2  | 1/15/1997 - 2/4/2000  | ESSC LARC     | \$189,507 |

|                   |         |                    |   |   |                        |  |           |
|-------------------|---------|--------------------|---|---|------------------------|--|-----------|
| N/A               | N/A     | 1997-006           | Dr. Mike Newchurch, PI                          | Tropospheric Ozone Trends from TOMS   | 10/11/1996             | NASA HQ<br>ACMAP                       | \$19,000  |
| NAG1-2026         | 5-20111 | 1997-501           | Dr. Mike Newchurch, PI                          | Aerosol Retrievals from High Resolution Broadband Radiances   | 1/1/1998 - 12/31/2001  | ESSC<br>LARC                           | \$142,330 |
| NAG5-7269         | 5-20186 | 1998-521           | Dr. Mike Newchurch, PI                          | Derivation of Tropospheric Ozone Climatology & Trends   | 5/15/1998 - 5/14/2002  | ESSC<br>GSFC                           | \$259,246 |
| N/A               | N/A     | 1998-374           | Dr. Christopher, PI<br>Dr. Mike Newchurch, Co-I | Validation and Intercomparison of TOMS Aerosol Products Using Satellite and Ground Based Measurements | 1998-2001              | NASA<br>ACMAP                          | \$240,000 |
| NAG1-2204         | 5-20621 | 1998-375           | Dr. Mike Newchurch, PI                          | Ozone Trends in SAGE, HALOE   | 7/1/1999 - 6/30/2002   | ESSC<br>LARC                           | \$275,066 |
| 40-RA-NR-108712   | 5-21272 | 2001-220           | Dr. Mike Newchurch, PI                          | Ozone Profile Measurements  | 2/12/2001 - 12/30/2001 | ESSC<br>NOAA                           | \$15,278  |
| NAG5-10965        | 5-21733 | 2001-316           | Dr. Mike Newchurch, PI                          | Ozone Retrieval Errors Associated with Clouds   | 6/1/2001 - 5/31/2002   | ESSC<br>GSFC                           | \$60,000  |
| NAG5-11248        | 5-21762 | 2001-063           | Dr. Mike Newchurch, PI                          | Optimal Aerosol Parameterization for Remote Sensing   | 8/15/2001 - 8/14/2004  | ESSC<br>GSFC                           | \$368,087 |
| NCC8-200          | 745064  | N/A                | Dr. Mike Newchurch, PI                          | TOMS Science Team   | 8/24/2001 - 8/9/2005   | ESSC<br>MSFC                           | \$15,000  |
| NAG5-11096        | 745087  | 2001-061           | Dr. Mike Newchurch, PI                          | Critical Assessment of TOMS-derived Tropospheric Ozone  | 9/1/2001 - 8/31/2005   | ESSC<br>GSFC                           | \$326,258 |
| NAG5-11100        | 745092  | 2000-420; 2004-535 | Dr. Mike Newchurch, PI                          | Validating AIRS Ozone Observations  | 9/1/2001 - 8/31/2006   | ESSC<br>GSFC                           | \$350,918 |
| RA1330-02-SE-0186 | 5-22070 | 2002-320           | Dr. Mike Newchurch, PI                          | Ozonesondes at the Huntsville Station 2002  | 10/1/2001 - 9/30/2002  | ESSC<br>NOAA                           | \$15,278  |
| 582-2-48649       | 5-21976 | 2002-148           | Dr. Mike Newchurch, PI                          | Analysis of Ozonesonde Data During TexAQS 2000  | 2/6/2002 - 8/31/2002   | ESSC<br>Texas Nat. Resource & Cons. Co | \$22,000  |
|                   |         |                    |   |   |                        | ESSC                                   | \$15,278  |

|                    |         |           |                           |  |                      |                             |             |
|--------------------|---------|-----------|---------------------------|--|----------------------|-----------------------------|-------------|
| RA 1330-03-SE-0202 | 5-22250 | 2003-139  | Dr. Mike Newchurch, PI    | Ozonesondes at the Huntsville Station 2003   | 10/1/2002-9/30/2003  | NOAA                        |             |
| 2002006            | 675011  | N/A       | Dr. Mike Newchurch, PI    | Cooperative Micro-Satellite Experiment   | 10/3/2002-3/31/2007  | RDESC Radiance Technologies | \$665,880   |
| N/A                | N/A     | N/A       | Dr. Mike Newchurch, PI    | Science Team Seed Funding for a Regional Atmospheric Profiling Center for Discovery, RAPCD | 2001                 | NASA MSFC                   | \$15,000    |
| NCC8-200           | 745078  | 2002-335  | Dr. Mike Newchurch, PI    | Atmospheric Chemistry  | 7/9/2003-8/9/2005    | ESSC MSFC                   | \$76,110    |
| RA133R-04-SE-0305  | 5-22656 | 2004-307  | Dr. Mike Newchurch, PI    | Ozonesondes at the Huntsville Station 2004   | 10/1/2003-9/30/2004  | ESSC NOAA                   | \$15,278    |
| 2002006            | 745133  | 2004-037  | Dr. Mike Newchurch, PI    | Cooperative Micro-Satellite Experiment   | 2/1/2004-3/31/2007   | ESSC Radiance Technologies  | \$177,173   |
| NNG04GM44G         | 745143  | 2005-323  | Dr. Mike Newchurch, PI    | Atmospheric Chemistry Studies Combining Satellite Observations                             | 6/15/2004-6/14/2007  | ESSC NASA HQ                | \$92,907    |
| RA 133R-05-SE-2640 | 745163  | N/A       | Dr. Mike Newchurch, PI    | Ozonesondes at the Huntsville Station 2005   | 10/1/2004-9/30/2005  | ESSC NASA HQ                | \$15,278    |
| TCN 05172          | 745174  | 2005-341  | Dr. Mike Newchurch, Co-I  | A Planning Initiative to Define Observational and Theoretical Mesoscale Phenomena          | 7/11/2005-11/30/2007 | ESSC BATTELLE               | \$58,083    |
| NNM05AA22A         | 745009  | 2005-402  | Dr. Mike Newchurch, PI    | Tropospheric Ozone Lidar and Ozonesondes at Huntsville                                     | 8/10/2005-8/9/2009   | ESSC NASA HQ                | \$629,789   |
| RA133R-06-SE-0773  | 745085  | 2006-189  | Dr. Mike Newchurch, PI    | Ozonesondes at the Huntsville Station 2006   | 10/1/2005-9/30/2006  | ESSC NOAA                   | \$4,000     |
| NNG06GH86G         | 745099  | 2005-356R | Dr. Mike Newchurch, PI    | Implementation and Assessment of Ozone Profiling   | 5/1/2006-4/30/2009   | ESSC NASA HQ                | \$224,999   |
| NA06NES4400008     | 745238  | 2006-238  | Dr. Mike Newchurch, Co-PI | Spaced Remote Sensing of Air Quality   | 6/1/2006-5/31/2009   | ESSC NOAA                   | \$1,800,000 |
| NNX06AC57G         | 745229  | 2004-578R | Dr. Mike Newchurch, PI    | Validation of OMI-Derived Tropospheric Ozone   | 7/1/2006-6/30/2009   | ESSC NASA HQ                | \$289,866   |
|                    | 745286  |           |                           |  |                      | ESSC                        | \$500,000   |

|                              |        |               |                                  |  |                                    |                        |                |
|------------------------------|--------|---------------|----------------------------------|--|------------------------------------|------------------------|----------------|
| NA07NES42<br>80005           |        | 2007-<br>387  | Dr. Mike<br>Newchurch<br>, Co-PI | Remote Sensing and Modeling<br>of Air Quality  | 8/1/2007<br>-<br>7/31/200<br>9     | NOAA                   |                |
| NNM05AA22<br>A               | 745275 | 2007-<br>311  | Dr. Mike<br>Newchurch<br>, PI    | Experiment to Improve Air<br>Quality Forecast  | 8/10/200<br>7-<br>8/9/2009         | ESSC<br>MSFC           | \$183,915      |
| NA08NES44<br>00018           | 745336 | 2008-<br>401  | Dr. Mike<br>Newchurch<br>, Co-PI | UAHuntsville Proposal to<br>support NOAA's Air Quality   | 8/1/2008<br>-<br>7/31/201<br>0     | ESSC<br>NOAA           | \$325,172      |
|                              |        |               | Dr. Mike<br>Newchurch<br>Co-PI   | Lidar Ceilometer Upgrade to<br>UAH Mobile Profiling System   | 3/9/2011<br>-<br>10/1/201<br>2     | UAH<br>ATS             | \$36,254       |
|                              |        |               | Dr. Mike<br>Newchurch<br>Co-PI   | MRI: Acquisition of a Portable<br>Doppler Wind and Aerosol Lidar<br>for Research Enhancements in<br>the Boundary Layer<br>Meteorology, Atmospheric<br>Chemistry, Aerosol Science and<br>Cloud Physics. | 8/1/2011<br>-<br>8/1/2012          | NSF<br>under<br>review | \$257,027      |
| NA09NES440<br>0017           | 745367 | 2009-<br>375R | Dr. Mike<br>Newchurch,<br>PI     | Satellite-Based Assessment of<br>Regional Air Quality and<br>Climate   | 8/1/2009<br>-<br>7/31/201<br>2     | ESSC<br>NOAA           | \$290,000      |
| NNM11AA01<br>A               | 745471 | 2011-<br>514  | Dr. Mike<br>Newchurch,<br>PI     | Tropospheric Ozone Lidar<br>Measurements<br>Initiative: UAH Activities   | 8/1/2011<br>-<br>7/31/201<br>2     | ESSC<br>NASA<br>HQ     | \$412,628      |
|                              | 745437 |               | Dr. Mike<br>Newchurch,<br>PI     | Tropospheric Ozone Lidar and<br>Ozonesondes at RAPCD for<br>EOS AURA Validation (2.9.1)  | 4/1/2011<br>to<br>3/31/201<br>6    | NASA                   | \$859k         |
|                              |        |               | Dr. Mike<br>Newchurch,<br>PI     | Tropospheric Ozone Lidar<br>Measurements Initiative.: UAH<br>Activities (2.9.2)  | 8/1/2011<br>to<br>7/31/201<br>6    | NASA                   | \$410k         |
|                              |        |               | Dr. Mike<br>Newchurch,<br>PI     | FY2014 Huntsville Ozone DIAL<br>Scanner Hardware Upgrade   | 5/15/201<br>4 to<br>9/15/201<br>4  | NASA                   | \$110k         |
|                              |        |               | Dr. Mike<br>Newchurch,<br>PI     | Tropospheric Ozone Lidar<br>Network (TOLNet)   | 10/1/201<br>4 to<br>9/30/201<br>7  | NASA                   | \$1.54M        |
|                              |        |               | Dr. Mike<br>Newchurch,<br>PI     | Tropospheric Ozone Lidar<br>Network (TOLNet)   | 10/1/201<br>7 to<br>9/30/201<br>9  | NASA                   | \$325k         |
|                              |        |               | Dr. Mike<br>Newchurch,<br>PI     | Tropospheric Ozone Lidar<br>Network (TOLNet)   | 10/1/201<br>0 ton<br>9/30/202<br>4 | NASA                   | \$2.25M        |
| <b>Total Awarded Amount:</b> |        |               |                                  |  |                                    |                        | <b>\$14.1M</b> |

## STUDENTS SUPERVISED

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### Undergraduate Research Students

| <b>Year</b> | <b>Student's Name</b>  |
|-------------|------------------------|
| 1992-1995   | Dawn Wallace Stripling |
| 1993-1996   | Colette Mitchell       |
| 1993-1995   | Stephanie Willingham   |
| 1993-1995   | Gabriel Collins        |
| 1993-1994   | Ananta Gudipaty        |
| 1993-1994   | Jennifer Bridges       |
| 1993        | Garvin Dean            |
| 1994-1995   | Laura Branch           |
| 1995-1996   | Kimberly Cox           |
| 1995-1996   | Lalitha Gud ipaty      |
| 1996-2001   | Leanne McAllister      |
| 1998-1999   | Yook Mei Chong         |
| 2000-2001   | Andayani Liauw         |
| 2001        | Lawanna McCleave       |
| 2002        | Hayley Cluck           |
| 2002-2003   | Jennifer Williams      |
| 2002-2003   | Lyndie Cyphers         |
| 2003-2004   | Sharon Robers          |
| 2003-2005   | Michael Robison        |
| 2004-2007   | Holly Searcy           |

|            |                   |
|------------|-------------------|
| 2006-2008  | Danielle Nuding   |
| 2007-2009  | Stephanie Long    |
| 2007-2009  | Stephanie Horne   |
| 2007       | Casey Swilley     |
| 2008-2009  | Ragavendra Yarasi |
| 2009       | Sharon Conrad     |
| 2009-2013  | Wes Cantrell      |
| 2013-2014  | Nancy Pospelov    |
| 2014-2015  | Clayton Craft     |
| 2015-2016  | Nathan Lawrence   |
| 2015-2016  | Michael Graham    |
| 2016-2017  | Chris Tran        |
| 2016-pres. | David Mercier     |
| 2016-pres. | Ankur Shah        |

### Graduate Students

| <b>Student</b> | <b>Degree &amp; Major Field of Study</b> | <b>Title of Paper, Thesis, or Dissertation</b>                    | <b>Expected/Actual Date of Graduation</b> |
|----------------|--|---|---|
| Karl Huston    | ATS MS                                   | Variations of stratospheric NO <sub>x</sub> across the terminator | Returned to private sector                |
| Eun Su Yang    | ATS, PhD                                 | Ozone trends from Arosa Dobson Umkehr                             | Fall 00 Graduated                         |
| Mohammed Ayoub | ATS, MS                                  | Ozonesonde measurements and analysis                              | 2002 MS                                   |
| Xiong Liu      | ATS, PhD                                 | TOMS Tropospheric Ozone Retrieval                                 | Fall 2002 Graduated                       |
| Da Sun         | ATS, PhD                                 | TOMS Tropospheric Ozone Retrieval                                 | 2003 PhD                                  |

|                   |          |   |                            |
|-------------------|----------|---|----------------------------|
| Jing Song         | ATS      | Tropospheric Ozone  | 2003<br>Transferred        |
| Shi Kuang         | ATS, PhD | Ozone Lidar Retrieval   | 2009 PhD                   |
| Judy Hopey        | ATS, MS  | MOUDI Aerosol Measurements  | 2006 MS                    |
| Alishia Holley    | ATS, MS  | Aerosol measurements  | 2005 PhD                   |
| Lucy Wang         | ATS, PhD | Chem Satellite obs.   | 2009 PhD                   |
| Rochelle Williams | ATS, PhD | Atm Plume modeling  | 2009, left the program     |
| Patrick Buckley   | ATS, MS  | Application of Cryogenic FTIR Spectroscopy for Monitoring Air Quality | 2011 PhD                   |
| Pavan Ilipilla    | ATS, MS  | N/A   | 2007<br>Transferred        |
| Guanyu Huang      | ATS, PhD | LES modeling of tropospheric ozone lidar observations                 | 2014<br>Graduated          |
| Wes Cantrell      | ATS, MS  | N/A   | Returned to private sector |
| Bo Wang           | ATS, PhD | TBD   |                            |
| Paula Tucker      | ATS, MS  | TBD   |                            |
| Kristen Pozsonyi  | ATS, PhD | TBD   |                            |

### Committees

| Student's Name | Degree & Major Field of Study | Title of Plan II Paper, Thesis or Dissertation | Term of Assignment | Role         |
|----------------|-------------------------------|--|--------------------|--------------|
| J. Herwehe     | ATS, PhD                      | Large Eddy Simulations                         | 1998-2000          | Comm. Member |
| Yuling Wu      | ATS, PhD                      | Air Pollution Modeling                         | 1998-2003          | Comm. Member |
| Jinlong Li     | ATS/GT, PhD                   | Atmospheric Chemistry                          | 1997-2002          | Comm. Member |
| Kurt Lightner  | ATS/UMBC, PhD                 | FTIR Ozone Profiles                            | 2001-2004          | Comm. Member |
| Casey Calimaio | ESS, MS                       |  | 2014-2017          | Comm. Member |
| Aaron Kaulfus  | ATS, PhD                      |  | 2017-Present       | Comm. Member |
| Megan McPeak   | ATS, MS                       |  | 2018-Present       | Comm. Member |

**Postdoctoral Associates**

| <b>Student's Name</b> | <b>Degree, Institution, Date</b> | <b>Field of Study</b>   | <b>Term of Assignment</b>    |
|-----------------------|----------------------------------|---|------------------------------|
| Jing Cao              | Ph.D. Georgia Tech, 1994         | Satellite remote sensing of stratospheric ozone                   | 1994-1995                    |
| Jae Hwan Kim          | Ph.D. U. Maryland, 1995          | Satellite remote sensing of atmospheric ozone                     | 1995-1996<br>NRC appointment |
| Shi Kuang             | Ph.D. UAH 2009                   | Lidar observations of atmospheric ozone and aerosols              | 2009-2011                    |
| Lihua Wang            | Ph.D. UAH 2009                   | Mesoscale modeling of atmospheric chemistry and lightning effects | 2009-2011                    |

**HONORS AND AWARDS**

- NASA Group Achievement Award for ARCTAS, 2009
- Oceanic and Atmospheric Research Outstanding Scientific Paper Award, 2007
- William T. Pecora Award, 2007
- NASA Group Achievement Award for the TOMS team, 2006
- NASA Group Achievement Award for the Intercontinental Chemical Transport Experiment North America Science Team, 2005
- Sigma Xi Researcher of the Year 2004, UAH Chapter
- Sigma Xi (Scientific research honor society) member
- Top-10 NASA Accomplishments for 2003; most popular AAAS and AGU web science story (2003): National Press Club announcement followed by >100 world-wide news stories: First Stage of Upper Atmospheric Ozone Recovery (2003).
- NASA Group Achievement Award (ATLAS-2 and ATLAS-3)
- NASA Group Achievement Award for ATLAS-2 mission, 1993
- NASA Group Achievement Award for ATLAS-3 mission, 1994

**STUDENT AWARDS**

- Danielle Nuding- awarded the Goldwater Scholarship, 2008
- Danielle Nuding- JPL Award- NASA Space Grant Summer Internship, 2007
- Stephanie Long became the first von Braun Scholarship recipient in UAH's College of Science

## **SERVICE**

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### **Major Departmental Service**

- ATS620 Ph.D. qualifying exam questions
- ATS551 Ph.D. qualifying exam questions
- ATS520 Ph.D. qualifying exam questions
- Chief Architect- Strategic Planning Committee, 2000-2002
- ATS551 Ph.D. qualifying exam questions
- ATS520, ATS620, ATS 622 qualifying exam questions

### **University Service**

- Regional Science Fair Judge, 2002-present
- State Science Fair Environ. Science Judge, 2002-present
- University Review Board, 2014-2016
- PTAC Member, 2003-2005, 2011-2012, 2013-2014
- Promotion Committee for Dr. Shuang Nan Zhang, 2006
- Alternate member of the College of Science Promotion and Tenure Committee, 2006
- Graduate Curriculum Committee Member, 2003-2005
- Undergrad. Science Scholarship Committee, 2004
- Publications Committee Member, 2000-2003
- University Building Committee Member, 2000-2003
- Chan Chair Search Committee Member, 2001

### **Professional Service**

- TEMPO science team member, 2013-present
- GEO-CAPE science team member, 2009-present
- OMI Science Team member, 2006-present
- AIRS science team member, 2000-present
- NOAA-CREST Scientific Advisory Committee, 2003-present
- LaRC External Scientific Review Board, 2008
- SAGE science team member, 1994-2007
- TOMS science team member, 1997-2007
- IOC/SPARC Ozone Trends Assessment Panel member, 1998-1999, 2006
- POAM science team member, 1996-2006
- NASA Space Station Scientific Advisory Committee member, 1999-2003
- Investigator, ATMOS science team, 1992-2000
- USA Scientific Review of Republic of Korea Space Science Program member, 1998

### **Public Service Activities**

- Baseball Coach, 1998-2001, 2005-2015
- Boy Scout Leader 2002-present
- Alabama Science Fair Judge 2002-present
- Lecturer on Frontiers in Science careers and research, 2005-2012
- St. John's Catholic School Board Member 2006-2008
- Cub Scout Leader 2001-2008
- Soccer Coach, 1999-2006
- Scientific mentor, NCAR SOARS program, 1998

**TO:** Dean of  
**FROM:** Department Chair of  
**RE:** Annual (May 15, 2018–May 14, 2019) Performance Evaluation for Michael J. Newchurch  
**DATE:** April 4, 2017

|          | Exceptional Performance | Above Average Performance | Average Performance | Below Average Performance | Unacceptable Performance |
|----------|-------------------------|---------------------------|---------------------|---------------------------|--------------------------|
| Teaching |                         |                           |                     |                           |                          |
| Research |                         |                           |                     |                           |                          |
| Service  |                         |                           |                     |                           |                          |
| Overall  |                         |                           |                     |                           |                          |

Teaching:

Research:

Service to institution, discipline and public:

Overall:

Department Chair Signature \_\_\_\_\_ Date \_\_\_\_\_

Faculty Acknowledgment: I have had the opportunity to discuss this evaluation with the department chair. I understand that I have the privilege of responding in writing to this evaluation and that such response will be attached to the evaluation.

Faculty Signature \_\_\_\_\_ Date \_\_\_\_\_

NOTE: This performance evaluation is one of the factors considered in determining reappointment, tenure, promotion, merit pay, and support for development, renewal, and participation in academic organizations.

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