

University of Groningen

## 3D visualization and analysis of HI in and around galaxies

Punzo, Davide

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*

Publisher's PDF, also known as Version of record

*Publication date:*

2017

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Punzo, D. (2017). *3D visualization and analysis of HI in and around galaxies*. Rijksuniversiteit Groningen.

### Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

### Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.



## Bibliography

- R. Allen. In V. di Gesu, L. Scarsi, P. Crane, et al., editors, *Data Analysis in Astronomy*, page 157, 1985. doi: 10.1007/978-1-4615-9433-8\_14.
- R. J. Allen. In C. van Schooneveld, editor, *Image formation from coherence functions in astronomy; Proceedings of the Forty-ninth International Colloquium, Groningen, Netherlands, August 10-12, 1978. (A79-44401 19-89) Dordrecht, D. Reidel Publishing Co., 1979, p. 143-155.*, pages 143–155, 1979.
- M. E. Anderson and J. N. Bregman. *The Astrophysical Journal*, 714:320–331, May 2010. doi: 10.1088/0004-637X/714/1/320.
- M. Arnaud and R. Rothenflug. *Astronomy and Astrophysics Supplement Series*, 60:425–457, June 1985.
- C. Arnoldus. Master’s thesis, Rijksuniversiteit Groningen, the Netherlands, 2015.
- S. Arnouts, D. Schiminovich, O. Ilbert, et al. *The Astrophysical Journal*, 619:L43–L46, January 2005.
- I. K. Baldry, K. Glazebrook, J. Brinkmann, et al. *The Astrophysical Journal*, 600:681–694, January 2004.
- I. K. Baldry, K. Glazebrook, T. Budavári, et al. *Monthly Notices of the Royal Astronomical Society*, 358:441–456, April 2005.

- I. K. Baldry, M. L. Balogh, R. G. Bower, et al. *Monthly Notices of the Royal Astronomical Society*, 373:469–483, December 2006.
- N. M. Ball and R. J. Brunner. *International Journal of Modern Physics D*, 19:1049–1106, 2010. doi: 10.1142/S0218271810017160.
- M. Banerji, O. Lahav, C. J. Lintott, et al. *Monthly Notices of the Royal Astronomical Society*, 406:342–353, July 2010. doi: 10.1111/j.1365-2966.2010.16713.x.
- D. G. Barnes and C. J. Fluke. In R. W. Argyle, P. S. Bunclark, and J. R. Lewis, editors, *Astronomical Data Analysis Software and Systems XVII*, volume 394 of *Astronomical Society of the Pacific Conference Series*, page 149, August 2008. URL <http://astronomy.swin.edu.au/s2plot/index.php?title=S2PLOT>.
- J. E. Barnes. *Monthly Notices of the Royal Astronomical Society*, 413: 2860–2872, June 2011. doi: 10.1111/j.1365-2966.2011.18358.x.
- J. E. Barnes and J. E. Hibbard. *The Astrophysical Journal*, 137:3071–3090, February 2009. doi: 10.1088/0004-6256/137/2/3071.
- U. Becciani, A. Costa, V. Antonuccio-Delogu, et al. *The Publications of the Astronomical Society of the Pacific*, 122:119–130, January 2010. doi: 10.1086/650345.
- E. F. Bell, D. H. McIntosh, N. Katz, et al. *The Astrophysical Journal*, 149: 289–312, December 2003.
- S. Bergner, M. Sedlmair, T. Möller, et al. *IEEE Transactions on Visualization and Computer Graphics*, 19(9):1499–1512, 2013. doi: 10.1109/TVCG.2013.61.
- E. Bertini. *IEEE Transactions on Visualization and Computer Graphics*, 17:2203–2212, 2011. ISSN 1077-2626. doi: 10.1109/TVCG.2011.229.
- F. Bigiel, A. Leroy, F. Walter, et al. *The Astronomical Journal*, 136:2846–2871, December 2008.
- R. Boomsma, T. A. Oosterloo, F. Fraternali, et al. *Astronomy and Astrophysics*, 490:555–570, November 2008.

- M. Borkin, A. Goodman, M. Halle, et al. In R. A. Shaw, F. Hill, and D. J. Bell, editors, *Astronomical Data Analysis Software and Systems XVI*, volume 376 of *Astronomical Society of the Pacific Conference Series*, page 621, October 2007.
- M. A. Borkin, N. A. Ridge, A. A. Goodman, et al. *ArXiv Astrophysics e-prints*, June 2005.
- A. Bosma. *The distribution and kinematics of neutral hydrogen in spiral galaxies of various morphological types*. PhD thesis, PhD Thesis, Groningen Univ., (1978), 1978.
- A. Bosma. *The Astronomical Journal*, 86:1825–1846, December 1981. doi: 10.1086/113063.
- R. Bouwens, T. Broadhurst, and G. Illingworth. *The Astrophysical Journal*, 593:640–660, August 2003a.
- R. J. Bouwens, G. D. Illingworth, P. Rosati, et al. *The Astrophysical Journal*, 595:589–602, October 2003b.
- R. J. Bouwens, G. D. Illingworth, R. I. Thompson, et al. *The Astrophysical Journal*, 624:L5–L8, May 2005.
- R. Braun and D. A. Thilker. *Astronomy and Astrophysics*, 417:421–435, April 2004. doi: 10.1051/0004-6361:20034423.
- J. N. Bregman. *The Astrophysical Journal*, 236:577–591, March 1980.
- E. W. Brugel, G. O. Domik, and T. R. Ayres. Technical report, September 1993.
- A. Buades, B. Coll, and J.-M. Morel. *Multiscale Modeling & Simulation*, 4 (2):490–530, 2005.
- A. J. Bunker, E. R. Stanway, R. S. Ellis, et al. *Monthly Notices of the Royal Astronomical Society*, 355:374–384, December 2004.
- E. Busekool, M. A. W. Verheijen, and et al. *in prep*, 2016.
- M. R. Calabretta. Wcslib and Pgsbox. Astrophysics Source Code Library, August 2011.

- M. R. Calabretta and E. W. Greisen. *Astronomy and Astrophysics*, 395: 1077–1122, December 2002a. doi: 10.1051/0004-6361:20021327.
- M. R. Calabretta and E. W. Greisen. *Astronomy and Astrophysics*, 395: 1077–1122, December 2002b. doi: 10.1051/0004-6361:20021327.
- R. Capuzzo-Dolcetta, M. Spera, and D. Punzo. *Journal of Computational Physics*, 236:580–593, March 2013. doi: 10.1016/j.jcp.2012.11.013.
- E. Carlinet and T. Géraud. *arXiv preprint arXiv:1212.1819*, 2012.
- M. Comparato, U. Becciani, A. Costa, et al. *The Publications of the Astronomical Society of the Pacific*, 119:898–913, August 2007. doi: 10.1086/521375.
- R. A. Crain, Y. M. Bahé, C. d. P. Lagos, et al. *Monthly Notices of the Royal Astronomical Society*, 464:4204–4226, February 2017. doi: 10.1093/mnras/stw2586.
- C. Crassin, F. Neyret, S. Lefebvre, et al. *In Proceedings of the 2009 symposium on Interactive 3D graphics and games*, 119:15–22, August 2009.
- L. P. Crosthwaite and J. L. Turner. *The Astronomical Journal*, 134:1827–1842, November 2007.
- I. Daubechies and W. Sweldens. *Journal of Fourier analysis and applications*, 4(3):247–269, 1998.
- J. de la Calleja and O. Fuentes. *Monthly Notices of the Royal Astronomical Society*, 349:87–93, March 2004. doi: 10.1111/j.1365-2966.2004.07442.x.
- T. DeFanti, M. Brown, and B. McCormick. *COMPUTER*, page 12–25, 1989. doi: 10.1109/2.35195.
- E. M. Di Teodoro and F. Fraternali. *Monthly Notices of the Royal Astronomical Society*, 451:3021–3033, August 2015a. doi: 10.1093/mnras/stv1213.
- E. M. Di Teodoro and F. Fraternali. 3D-Barolo: 3D fitting tool for the kinematics of galaxies. *Astrophysics Source Code Library*, July 2015b.

- E.M. Di Teodoro and F. Fraternali. *Monthly Notices of the Royal Astronomical Society*, 2015c.
- G. O. Domik. In A. Heck and F. Murtagh, editors, *European Southern Observatory Conference and Workshop Proceedings*, volume 43 of *European Southern Observatory Conference and Workshop Proceedings*, page 249, September 1992.
- G. O. Domik and K. D. Mickus-Miceli. In D. M. Worrall, C. Biemesderfer, and J. Barnes, editors, *Astronomical Data Analysis Software and Systems I*, volume 25 of *Astronomical Society of the Pacific Conference Series*, page 95, 1992.
- A. R. Duffy, M. J. Meyer, L. Staveley-Smith, et al. *Monthly Notices of the Royal Astronomical Society*, 426:3385–3402, November 2012. doi: 10.1111/j.1365-2966.2012.21987.x.
- R. D. Ekers and R. J. Allen. In C. de Jager and H. Nieuwenhuijzen, editors, *Image Processing Techniques in Astronomy*, volume 54 of *Astrophysics and Space Science Library*, page 309, December 1975.
- H. I. Ewen and E. M. Purcell. *Nature*, 168:356, September 1951.
- A. Fedorov, R. Beichel, J. Kalpathy-Cramer, et al. 30(9):1323–41, 11 2012. doi: 10.1016/j.mri.2012.05.001.
- X. Fernandez, J. H. van Gorkom, K. M. Hess, et al. *ArXiv e-prints*, March 2013.
- G. Ferrand, J. English, and P. Irani. *ArXiv e-prints*, July 2016.
- L. Flöer and B. Winkel. *Astronomical Society of the Pacific Conference Series*, 29:244–250, January 2012. doi: 10.1071/AS11042.
- C. J. Fluke and D. G. Barnes. *ArXiv e-prints*, January 2016.
- T. Fogal and J. Kruger. In *Proceedings of the 15th International Workshop on Vision, Modeling, and Visualization*, November 2010.
- F. Fraternali, G. van Moorsel, R. Sancisi, et al. *The Astronomical Journal*, 123:3124–3140, June 2002. doi: 10.1086/340358.

- K. Frenkel. *Communications of the ACM*, page 31–121, 1988. doi: 10.1145/42372.42373.
- D. Le Gall and A. Tabatabai. In *Acoustics, Speech, and Signal Processing, 1988. ICASSP-88., 1988 International Conference on*, pages 761–764. IEEE, 1988.
- G. Gavazzi, M. Fumagalli, O. Cucciati, et al. *Astronomy and Astrophysics*, 517:A73, July 2010.
- S. Genel, M. Vogelsberger, V. Springel, et al. *Monthly Notices of the Royal Astronomical Society*, 445:175–200, November 2014. doi: 10.1093/mnras/stu1654.
- N. Giese, T. van der Hulst, P. Serra, et al. *Monthly Notices of the Royal Astronomical Society*, 461:1656–1673, September 2016. doi: 10.1093/mnras/stw1426.
- R. C. Gonzalez and R. E. Woods. *Digital image processing*. Prentice hall, Upper Saddle River, New Jersey 07458, 2002.
- R. Gooch. In G. H. Jacoby and J. Barnes, editors, *Astronomical Data Analysis Software and Systems V*, volume 101 of *Astronomical Society of the Pacific Conference Series*, page 80, 1996. URL <http://www.atnf.csiro.au/computing/software/karma/>.
- A. A. Goodman. *Astronomische Nachrichten*, 333:505, June 2012. doi: 10.1002/asna.201211705.
- A. A. Goodman, E. W. Rosolowsky, M. A. Borkin, et al. *Nature*, 457:63–66, January 2009. doi: 10.1038/nature07609.
- Aditya Goyal, Akhilesh Bijalwan, and Mr Kuntal Chowdhury. *International Journal of Advanced Research in Computer Engineering & Technology*, 1 (4), 2012.
- P. Graff, F. Feroz, M. P. Hobson, et al. *Monthly Notices of the Royal Astronomical Society*, 441:1741–1759, June 2014. doi: 10.1093/mnras/stu642.
- E. W. Greisen. *Information Handling in Astronomy - Historical Vistas*, 285:109, March 2003. doi: 10.1007/0-306-48080-8-7.

- E. W. Greisen, M. R. Calabretta, F. G. Valdes, et al. *Astronomy and Astrophysics*, 446:747–771, February 2006a. doi: 10.1051/0004-6361:20053818.
- E. W. Greisen, M. R. Calabretta, F. G. Valdes, et al. *Astronomy and Astrophysics*, 446:747–771, February 2006b. doi: 10.1051/0004-6361:20053818.
- F. Haardt and P. Madau. *Astrophysical Journal*, 461:20, April 1996. doi: 10.1086/177035.
- M. Hadwiger, J. Beyer, W. Jeong, et al. *IEEE Transactions on Visualization, Computer Graphics*, 18, 2012. doi: 10.1109/TVCG.2012.240.
- D. J. Hanish, G. R. Meurer, H. C. Ferguson, et al. *The Astrophysical Journal*, 649:150–162, September 2006.
- C. D. Hansen and C. Johnson. *The Visualization Handbook*. Academic Press, December 2004.
- A. Hassan and C. J. Fluke. *Publications of the Astronomical Society of Australia*, 28:150–170, June 2011. doi: 10.1071/AS10031.
- A. H. Hassan, C. J. Fluke, D. G. Barnes, et al. *Monthly Notices of the Royal Astronomical Society*, 429:2442–2455, March 2013. doi: 10.1093/mnras/sts513.
- Henk J. A. M. Heijmans. *Computer Vision and Image Understanding*, 73: 99–120, 1999.
- A. J. G. Hey, S. Tansley, and K. M. Tolle. *The Fourth Paradigm: Data-Intensive Scientific Discovery*. Microsoft Research, 2009. ISBN 9780982544204. URL <http://research.microsoft.com/en-us/collaboration/fourthparadigm/>.
- B. W. Holwerda, S.-L. Blyth, and A. J. Baker. In R. J. Tuffs and C. C. Popescu, editors, *IAU Symposium*, volume 284 of *IAU Symposium*, pages 496–499, August 2012. doi: 10.1017/S1743921312009702.
- A. M. Hopkins. *The Astrophysical Journal*, 615:209–221, November 2004.



- A. M. Hopkins and J. F. Beacom. *The Astrophysical Journal*, 651:142–154, November 2006.
- A. M. Hopkins, C. J. Miller, A. J. Connolly, et al. *The Astronomical Journal*, 123:1086–1094, February 2002. doi: 10.1086/338316.
- S. Johnston, R. Taylor, M. Bailes, et al. *Experimental Astronomy*, 22: 151–273, December 2008. doi: 10.1007/s10686-008-9124-7.
- J. L. Jonas. *IEEE Proceedings*, 97:1522–1530, August 2009. doi: 10.1109/JPROC.2009.2020713.
- W. A. Joye. In C. Gabriel, C. Arviset, D. Ponz, et al., editors, *Astronomical Data Analysis Software and Systems XV*, volume 351 of *Astronomical Society of the Pacific Conference Series*, page 574, July 2006.
- G. I. G. Józsa, F. Kenn, U. Klein, et al. *Astronomy and Astrophysics*, 468: 731–774, June 2007. doi: 10.1051/0004-6361:20066164.
- G. I. G. Józsa, F. Kenn, T. A. Oosterloo, et al. TiRiFiC: Tilted Ring Fitting Code. Astrophysics Source Code Library, August 2012.
- P. Kamphuis, G. I. G. Józsa, S.-. H. Oh, et al. FAT: Fully Automated TiRiFiC. Astrophysics Source Code Library, July 2015a.
- P. Kamphuis, G. I. G. Józsa, S.-. H. Oh, et al. *Monthly Notices of the Royal Astronomical Society*, 452:3139–3158, September 2015b. doi: 10.1093/mnras/stv1480.
- W. Karman, K. I. Caputi, C. Grillo, et al. *ArXiv e-prints*, September 2014.
- G. Kauffmann, S. D. M. White, T. M. Heckman, et al. *Monthly Notices of the Royal Astronomical Society*, 353:713–731, September 2004.
- D. Keim, J. Kohlhammer, G. Ellis, et al., editors. *Mastering the information age: solving problems with Visual Analytics*. Eurographics Association, 2010. URL <http://www.vismaster.eu/book/>.
- R. C. Kennicutt, Jr. *The Astrophysical Journal*, 498:541, May 1998a.
- R. C. Kennicutt, Jr. *Astronomy and Astrophysics*, 36:189–232, 1998b.
- R. C. Kennicutt, Jr., D. Calzetti, F. Walter, et al. *The Astrophysical Journal*, 671:333–348, December 2007.

- B. R. Kent. *Publications of the Astronomical Society of the Pacific*, 125: 731–748, June 2013. doi: 10.1086/671412.
- B. R. Kent. *3D Scientific Visualization with Blender*. March 2015.
- S. M. Kent. *The Astronomical Journal*, 93:816–832, April 1987. doi: 10.1086/114366.
- D. Kereš, N. Katz, R. Davé, et al. *Monthly Notices of the Royal Astronomical Society*, 396:2332–2344, July 2009.
- B. S. Koribalski. *Publications of the Astronomical Society of Australia*, 29: 359–370, August 2012. doi: 10.1071/AS12030.
- E. Kuminski, J. George, J. Wallin, et al. *Publications of the Astronomical Society of the Pacific*, 126:959–967, November 2014. doi: 10.1086/678977.
- W. J. van der Laan, A. C. Jalba, and J. B. T. M. Roerdink. *Ieee transactions on parallel and distributed systems*, 22(1):132–146, 1 2011. ISSN 1045-9219. doi: 10.1109/TPDS.2010.143. Relation: <http://www.rug.nl/informatica/onderzoek/bernoulli> Rights: University of Groningen, Johann Bernoulli Institute for Mathematics and Computer Science.
- P. Lah, J. N. Chengalur, F. H. Briggs, et al. *Monthly Notices of the Royal Astronomical Society*, 376:1357–1366, April 2007.
- E. Le Floc’h, C. Papovich, H. Dole, et al. *The Astrophysical Journal*, 632: 169–190, October 2005.
- W. E. Lorensen and H. E. Cline. *SIGGRAPH Comput. Graph.*, 21(4):163–169, August 1987. ISSN 0097-8930. doi: 10.1145/37402.37422. URL <http://doi.acm.org/10.1145/37402.37422>.
- P. Madau, L. Pozzetti, and M. Dickinson. *The Astrophysical Journal*, 498: 106, May 1998.
- S. Mallat. *A wavelet tour of signal processing*. Academic press, 1999.
- A. Marasco, F. Marinacci, and F. Fraternali. *Monthly Notices of the Royal Astronomical Society*, 433:1634–1647, August 2013.

- F. Marinacci, F. Fraternali, C. Nipoti, et al. *Monthly Notices of the Royal Astronomical Society*, 415:1534–1542, August 2011.
- T. Mauch. PhD thesis, PhD Thesis, Univ. of Sydney, (2005), 2005.
- B. McCormick, T. DeFanti, and M. Brown. *Computer Graphics*, page 21, 1987. doi: 10.1145/43965.43966.
- J. P. McMullin, B. Waters, D. Schiebel, et al. In R. A. Shaw, F. Hill, and D. J. Bell, editors, *Astronomical Data Analysis Software and Systems XVI*, volume 376 of *Astronomical Society of the Pacific Conference Series*, page 127, October 2007.
- D.J.R. Meagher. *Octree Encoding: a New Technique for the Representation, Manipulation and Display of Arbitrary 3-D Objects by Computer*. 1980. URL <https://books.google.nl/books?id=CgRPOAAACAAJ>.
- K. D. Mickus, E. W. Brugel, G. O. Domik, et al. In *Bulletin of the American Astronomical Society*, volume 22 of *Bulletin of the American Astronomical Society*, page 1259, September 1990a.
- K. D. Mickus, G. O. Domik, E. W. Brugel, et al. In *Bulletin of the American Astronomical Society*, volume 22 of *Bulletin of the American Astronomical Society*, page 828, March 1990b.
- P. Mildenerger, M. Eichelberg, and E. Martin. *European radiology*, 12(4): 920–927, 2002.
- J. Mink, R. G. Mann, R. Hanisch, et al. In A. R. Taylor and E. Rosolowsky, editors, *Astronomical Data Analysis Software and Systems XXIV (ADASS XXIV)*, volume 495 of *Astronomical Society of the Pacific Conference Series*, page 11, September 2015.
- J. D. Mink. *Astronomy and Computing*, 12:128–132, September 2015. doi: 10.1016/j.ascom.2015.07.001.
- K. Morelanda, L. Avilab, and L. A. Fiska. *Visualization and Data Analysis*, 2007.
- U. Moschini, P. Teeninga, M. H. F. Wilkinson, et al. In *Proceedings of the 2014 Conference on Big Data from Space (BiDS 2014)*, pages 232–235, 2014.

- C. A. Muller and J. H. Oort. *Nature*, 168:357–358, September 1951.
- J. P. Naiman. *Astronomy and Computing*, 15:50–60, April 2016. doi: 10.1016/j.ascom.2016.02.002.
- R. Norris. In *Astronomical Data Analysis Software and Systems III*, 61:51, 1994.
- L. Nyland, M. Harris , and J. Prins. Fast n-body simulation with cuda, 2007.
- T. Oosterloo. *Proceedings of the Astronomical Society of Australia*, 12:215, August 1995.
- T. Oosterloo and J. van Gorkom. *Astronomy and Astrophysics*, 437:L19–L22, July 2005. doi: 10.1051/0004-6361:200500127.
- T. Oosterloo, F. Fraternali, and R. Sancisi. *The Astronomical Journal*, 134:1019, September 2007. doi: 10.1086/520332.
- T. Oosterloo, M. Verheijen, and W. van Cappellen. In *ISKAF2010 Science Meeting*, page 43, 2010.
- M. Ouchi, K. Shimasaku, S. Okamura, et al. *The Astrophysical Journal*, 611:660–684, August 2004.
- P. J. E. Peebles. *Astrophysical Journal*, 153:1, July 1968. doi: 10.1086/149628.
- F. I. Pelupessy, A. van Elteren, N. de Vries, et al. *Astronomy and Astrophysics*, 557:A84, September 2013. doi: 10.1051/0004-6361/201321252.
- W. D. Pence. CFITSIO: A FITS File Subroutine Library. Astrophysics Source Code Library, October 2010.
- W. D. Pence, L. Chiappetti, C. G. Page, et al. *Astronomy and Astrophysics*, 524:A42, December 2010. doi: 10.1051/0004-6361/201015362.
- P. G. Pérez-González, G. H. Rieke, E. Egami, et al. *The Astrophysical Journal*, 630:82–107, September 2005.
- R. A. Perley, C. J. Chandler, B. J. Butler, et al. *The Astrophysical Journal*, 739:L1, September 2011. doi: 10.1088/2041-8205/739/1/L1.

- P. Perona and J. Malik. *Pattern Analysis and Machine Intelligence, IEEE Transactions on*, 12(7):629–639, 1990.
- Planck Collaboration, P. A. R. Ade, N. Aghanim, et al. *Astronomy and Astrophysics*, 594:A13, September 2016. doi: 10.1051/0004-6361/201525830.
- A. Popping, R. Jurek, T. Westmeier, et al. *Publications of the Astronomical Society of Australia*, 29:318–339, February 2012. doi: 10.1071/AS11067.
- S. F. Portegies Zwart, R. G. Belleman, and P. M. Geldof. *New Astronomy*, 12:641–650, November 2007. doi: 10.1016/j.newast.2007.05.004.
- J. X. Prochaska, S. Herbert-Fort, and A. M. Wolfe. *The Astrophysical Journal*, 635:123–142, December 2005.
- D. Punzo, J. M. van der Hulst, J. B. T. M. Roerdink, et al. *Astronomy and Computing*, 12:86–99, September 2015. doi: 10.1016/j.ascom.2015.05.004.
- D. Punzo, J. M. van der Hulst, and J. B. T. M. Roerdink. *Astronomy and Computing*, 17:163–176, October 2016a. doi: 10.1016/j.ascom.2016.09.002.
- D. Punzo, T. van der Hulst, J. Roerdink, et al. SlicerAstro: Astronomy (HI) extension for 3D Slicer. Astrophysics Source Code Library, November 2016b.
- P. Ramachandran and G. Varoquaux. *ArXiv e-prints*, October 2010.
- P. Ramachandran and G. Varoquaux. Mayavi2: 3D Scientific Data Visualization and Plotting, May 2012. Astrophysics Source Code Library.
- M. Ramatsoku, M. A. W. Verheijen, R. C. Kraan-Korteweg, et al. *Monthly Notices of the Royal Astronomical Society*, 460:923–941, July 2016. doi: 10.1093/mnras/stw968.
- S. M. Rao, D. A. Turnshek, and D. B. Nestor. *The Astrophysical Journal*, 636:610–630, January 2006.
- J. Ribaldo, N. Lehner, J. C. Howk, et al. *The Astrophysical Journal*, 743: 207, December 2011. doi: 10.1088/0004-637X/743/2/207.

- J. Richard, V. Patricio, J. Martinez, et al. *Monthly Notices of the Royal Astronomical Society*, 446:L16–L20, January 2015. doi: 10.1093/mnras/sl150.
- J. B. T. M. Roerdink. *Pan European Networks. Science & Technology*, 9:116–117, July 2013. URL <http://www.paneuropeannetworkspublications.com/ST9/#116>.
- S. D. Roth. *Elsevier*, 18:109–144, 1982. doi: 10.1016/0146-664X(82)90169-1.
- S. Rusinkiewicz and M. Levoy. *In Proceedings Of The 27Th Annual Conference On Computer Graphics And Interactive Techniques*, pages 343–352, 2000. doi: 10.1145/344779.344940.
- Azadeh Safari and Yinan Kong. *In Communications and Information Technologies (ISCIT), 2013 13th International Symposium on*, pages 325–329. IEEE, 2013.
- S. Salim. *Serbian Astronomical Journal*, 189:1–14, December 2014. doi: 10.2298/SAJ1489001S.
- S. F. Sánchez, R. C. Kennicutt, A. Gil de Paz, et al. *Astronomy and Astrophysics*, 538:A8, February 2012. doi: 10.1051/0004-6361/201117353.
- R. Sancisi. In J. E. Barnes and D. B. Sanders, editors, *Galaxy Interactions at Low and High Redshift*, volume 186 of *IAU Symposium*, page 71, 1999.
- R. Sancisi, F. Fraternali, T. Oosterloo, et al. *The Astronomy and Astrophysics Review*, 15:189–223, June 2008. doi: 10.1007/s00159-008-0010-0.
- J. Schaye, R. A. Crain, R. G. Bower, et al. *Monthly Notices of the Royal Astronomical Society*, 446:521–554, January 2015. doi: 10.1093/mnras/stu2058.
- M. Schmidt. *The Astrophysical Journal*, 129:243, March 1959.
- W. Schroeder, K. Martin, and B. Lorensen. *The Visualization Toolkit (4th ed.)*. Kitware, December 2006.

- K. F. Schuster, C. Kramer, M. Hitschfeld, et al. *Astronomy and Astrophysics*, 461:143–151, January 2007.
- G. Sedmak, M. Capaccioli, R. J. Allen, et al. *Image processing in astronomy. Proceedings of the 5th colloquium on astrophysics. International workshop on image processing in astronomy, held at Trieste, Italy, June 4-8, 1979*. 1979.
- P. Serra, R. Jurek, and L. Flöer. *Publications of the Astronomical Society of Australia*, 29:296–300, February 2012a. doi: 10.1071/AS11065.
- P. Serra, T. Oosterloo, R. Morganti, et al. *Monthly Notices of the Royal Astronomical Society*, 422:1835–1862, May 2012b. doi: 10.1111/j.1365-2966.2012.20219.x.
- P. Serra, B. Koribalski, P.-A. Duc, et al. *Monthly Notices of the Royal Astronomical Society*, 428:370–380, January 2013.
- P. Serra, T. Westmeier, N. Giese, et al. SoFiA: Source Finding Application. Astrophysics Source Code Library, December 2014.
- P. Serra, T. Westmeier, N. Giese, et al. *Monthly Notices of the Royal Astronomical Society*, 448:1922–1929, April 2015. doi: 10.1093/mnras/stv079.
- L. S. Sparke, G. van Moorsel, U. J. Schwarz, et al. *The Astronomical Journal*, 137:3976–3992, April 2009. doi: 10.1088/0004-6256/137/4/3976.
- V. Springel, S. D. M. White, A. Jenkins, et al. *Nature*, 435:629–636, June 2005. doi: 10.1038/nature03597.
- J. L. Starck and F. Murtagh. *Astronomy and Astrophysics*, 288:342–348, August 1994.
- M. Steinmetz and J. F. Navarro. *New Astronomy*, 7:155–160, June 2002. doi: 10.1016/S1384-1076(02)00102-1.
- R. S. Sutherland and M. A. Dopita. *Astrophysical Journal Supplement Series*, 88:253–327, September 1993. doi: 10.1086/191823.
- M. Taylor, T. Boch, M. Fitzpatrick, et al. *ArXiv e-prints*, October 2011.

- M. B. Taylor. In P. Shopbell, M. Britton, and R. Ebert, editors, *Astronomical Data Analysis Software and Systems XIV*, volume 347 of *Astronomical Society of the Pacific Conference Series*, page 29, December 2005.
- R. Taylor. *Astronomy and Computing*, 13:67–79, November 2015. doi: 10.1016/j.ascom.2015.10.002.
- R. Taylor, R. F. Minchin, H. Herbst, et al. *Monthly Notices of the Royal Astronomical Society*, 443:2634–2649, September 2014. doi: 10.1093/mnras/stu1305.
- P. Teeninga, U. Moschini, S. C. Trager, et al. pages 157–168, 2015a.
- P. Teeninga, U. Moschini, S. C. Trager, et al. In *Image Processing (ICIP), 2015 IEEE International Conference on*, pages 1046–1050. 2015b.
- C. Tenllado, J. Setoain, M. Prieto, et al. *IEEE Transactions Parallel Distributed Systems*, 19(3):299–310, 2008.
- B. Thomas, T. Jenness, F. Economou, et al. *Astronomy and Computing*, 12:133–145, September 2015. doi: 10.1016/j.ascom.2015.01.009.
- J. J. Thomas and K. A. Cook, editors. *Illuminating the Path: The Research and Development Agenda for Visual Analytics*. IEEE Press, 2005. URL [http://vis.pnnl.gov/pdf/RD\\_Agenda\\_VisualAnalytics.pdf](http://vis.pnnl.gov/pdf/RD_Agenda_VisualAnalytics.pdf).
- R. I. Thompson, D. Eisenstein, X. Fan, et al. *The Astrophysical Journal*, 647:787–798, August 2006.
- J. W. Trayford, T. Theuns, R. G. Bower, et al. *Monthly Notices of the Royal Astronomical Society*, 460:3925–3939, August 2016. doi: 10.1093/mnras/stw1230.
- T. S. van Albada, J. N. Bahcall, K. Begeman, et al. *The Astrophysical Journal*, 295:305–313, August 1985.
- H. C. van de Hulst. *Nederlands Tijdschrift voor Natuurkunde*, 11, 1944.
- J. M. van der Hulst, J. P. Terlouw, K. G. Begeman, et al. In D. M. Worrall, C. Biemesderfer, and J. Barnes, editors, *Astronomical Data Analysis Software and Systems I*, volume 25 of *Astronomical Society of the Pacific*



- Conference Series*, page 131, 1992. URL <https://www.astro.rug.nl/~gipsy/articles/gipsypaper.html>.
- J. M. van der Hulst, T. S. van Albada, and R. Sancisi. In J. E. Hibbard, M. Rupen, and J. H. van Gorkom, editors, *Gas and Galaxy Evolution*, volume 240 of *Astronomical Society of the Pacific Conference Series*, page 451, 2001.
- M. Verheijen, T. Oosterloo, G. Heald, et al. In *Panoramic Radio Astronomy: Wide-field 1-2 GHz Research on Galaxy Evolution*, page 10, 2009.
- M. A. W. Verheijen. In A. Diaferio, editor, *IAU Colloq. 195: Outskirts of Galaxy Clusters: Intense Life in the Suburbs*, pages 394–400, July 2004. doi: 10.1017/S1743921304000833.
- M. A. W. Verheijen and M. Zwaan. In J. E. Hibbard, M. Rupen, and J. H. van Gorkom, editors, *Gas and Galaxy Evolution*, volume 240 of *Astronomical Society of the Pacific Conference Series*, page 867, 2001.
- M. A. W. Verheijen, T. A. Oosterloo, W. A. van Cappellen, et al. In R. Minchin and E. Momjian, editors, *The Evolution of Galaxies Through the Neutral Hydrogen Window*, volume 1035 of *American Institute of Physics Conference Series*, pages 265–271, August 2008. doi: 10.1063/1.2973599.
- H. T. Vo, J. Bronson, B. Summa, et al. *IEEE Symposium on Large-Scale Data Analysis and Visualization*, 2011. URL [http://serv.cusp.nyu.edu/~hvo/papers/cloud\\_vis.pdf](http://serv.cusp.nyu.edu/~hvo/papers/cloud_vis.pdf).
- M. G. R. Vogelaar and J. P. Terlouw. In F. R. Harnden, Jr., F. A. Primini, and H. E. Payne, editors, *Astronomical Data Analysis Software and Systems X*, volume 238 of *Astronomical Society of the Pacific Conference Series*, page 358, 2001.
- M. Vogelsberger, S. Genel, V. Springel, et al. *Monthly Notices of the Royal Astronomical Society*, 444:1518–1547, October 2014. doi: 10.1093/mnras/stu1536.
- F. P. A. Vogt, C. I. Owen, L. Verdes-Montenegro, et al. *The Astrophysical Journal*, 818:115, February 2016. doi: 10.3847/0004-637X/818/2/115.

- D. Vohl, D. G. Barnes, C. J. Fluke, et al. *ArXiv e-prints*, October 2016.
- F. Walter, E. Brinks, W. J. G. de Blok, et al. *The Astronomical Journal*, 136:2563–2647, December 2008a. doi: 10.1088/0004-6256/136/6/2563.
- F. Walter, E. Brinks, W. J. G. de Blok, et al. *The Astronomical Journal*, 136:2563, December 2008b. doi: 10.1088/0004-6256/136/6/2563.
- P. J. Warner, M. C. H. Wright, and J. E. Baldwin. *Monthly Notices of the Royal Astronomical Society*, 163, 1973.
- A. R. Weeks. *Fundamentals of electronic image processing*. SPIE Optical Engineering Press Bellingham, 1996.
- R. Weinberger, W. Saurer, and R. Seeberger. *Astronomy and Astrophysics Supplement*, 110:269, April 1995.
- M. A. Westenberg, J. B. T. M. Roerdink, and M. H. F. Wilkinson. *Image Processing, IEEE Transactions on*, 16(12):2943–2952, 2007.
- S. D. M. White and M. J. Rees. *Monthly Notices of the Royal Astronomical Society*, 183:341–358, May 1978. doi: 10.1093/mnras/183.3.341.
- M. T. Whiting. *Monthly Notices of the Royal Astronomical Society*, 421: 3242–3256, April 2012. doi: 10.1111/j.1365-2966.2012.20548.x.
- A. M. Wink and J. B. T. M. Roerdink. *Medical Imaging, IEEE Transactions on*, 23(3):374–387, 2004.
- C. Wolf, K. Meisenheimer, H.-W. Rix, et al. *Astronomy and Astrophysics*, 401:73–98, April 2003.
- T. Wong and L. Blitz. *The Astrophysical Journal*, 569:157–183, April 2002.
- T. K. Wyder, D. C. Martin, T. A. Barlow, et al. *The Astronomical Journal*, 696:1834–1853, May 2009.
- G. Wyvill, C. McPheeters, and B. Wyvill. *The Visual Computer*, 2(4): 227–234, 1986. ISSN 1432-2315. doi: 10.1007/BF01900346. URL <http://dx.doi.org/10.1007/BF01900346>.
- T. S. Yoo, M. J. Ackerman, W. E. Lorensen, et al. *Studies in health technology and informatics*, pages 586–592, 2002.

- 
- L. Yu, K. Efstathiou, P. Isenberg, et al. *IEEE Transactions on Visualization, Computer Graphics*, 18(12):2245–2254, Dec 2012. ISSN 1077-2626. doi: 10.1109/TVCG.2012.217.
- L. Yu, K. Efstathiou, P. Isenberg, et al. *IEEE Transactions on Visualization, Computer Graphics*, 22(1):886–895, 2016. ISSN 1077-2626. doi: doi.ieeecomputersociety.org/10.1109/TVCG.2015.2467202.
- M. A. Zwaan, M. J. Meyer, L. Staveley-Smith, et al. *Monthly Notices of the Royal Astronomical Society*, 359:L30–L34, May 2005.