

Social Robots - A Science Comic

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Abstract

Should social robots become part of our society?

Embedded in an exciting crime story, the science comic by Oliver Korn and Jonas Grund conveys the current state and outlook of science on social robots.

The story takes place in the near future: In an international project, scientists are researching the requirements for social robots for the health sector. Shortly before the prototype of a nursing robot is used in a field study, it disappears without a trace. In her first major case, the young inspector Kira embarks on a journey into the world of science. In the process, she learns a lot about social robots, AI and the world of international scientific cooperation. Again and again, critical voices are heard: anti-robot activists protest against automation and a dwindling of humanity and empathy. Even in the Commissioner's family, the possible care of elderly people by robots is controversially discussed.

The overarching goal is to build knowledge across all age groups so that the advantages and disadvantages of these new technologies can be discussed controversially but knowledgeably. "Social Robots - a Science Comic" is a contribution to an informed discussion in the fields of robotics, artificial intelligence, ethics and politics and is thus also suitable as a teaching and learning tool.

The comic was conceived and designed for young people and adults. In particular, however, for those who have hardly come into contact with social robots and artificial intelligence so far. Another target group are people working in the health care sector, because the care and nursing of elderly people are considered to be one of the most important areas of application for social robots in the future.

DINA4 portrait format, hardcover thread stitching, published in German and English. Self-published by the Affective & Cognitive Institute (ACI), Offenburg University.

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Jonas Grund & Oliver Korn

Social Robots

A Science Comic



SCROLLS

This project was developed by the **Affective and Cognitive Institute** of Offenburg University of Applied Sciences and was supported by the **Arab-German Young Academy of Sciences and Humanities (AGYA)**.

Further information can be found at aci.hs-offenburg.de and [agyainfo](https://agyainfo.de).

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IMPORTANT CHARACTERS



Detective Kira

The newly appointed detective is eager to prove herself and solve her first case. Does she manage to find the right clues in all the theories and explanations of the scientists? You can bet on it! Kira does not let herself be beaten - even when she is facing emotional activists.



Dr. Oliver Korn as **Prof. Korn**

Professor Korn is head of the research institute ACI and a member of AGYA. He tries to support the young detective with all his knowledge. Unfortunately, he likes to digress when it comes to his passion social robots.



A.R.T.A.L

Prof. Korn's small knowledge robot would be very useful. If only he could tell his flood of information at the right time.



Rebecca and David

Rebecca and David are both PhD candidates and are as different as day and night. However, they are united by their passion for their work and they support Detective Kira as best they can.

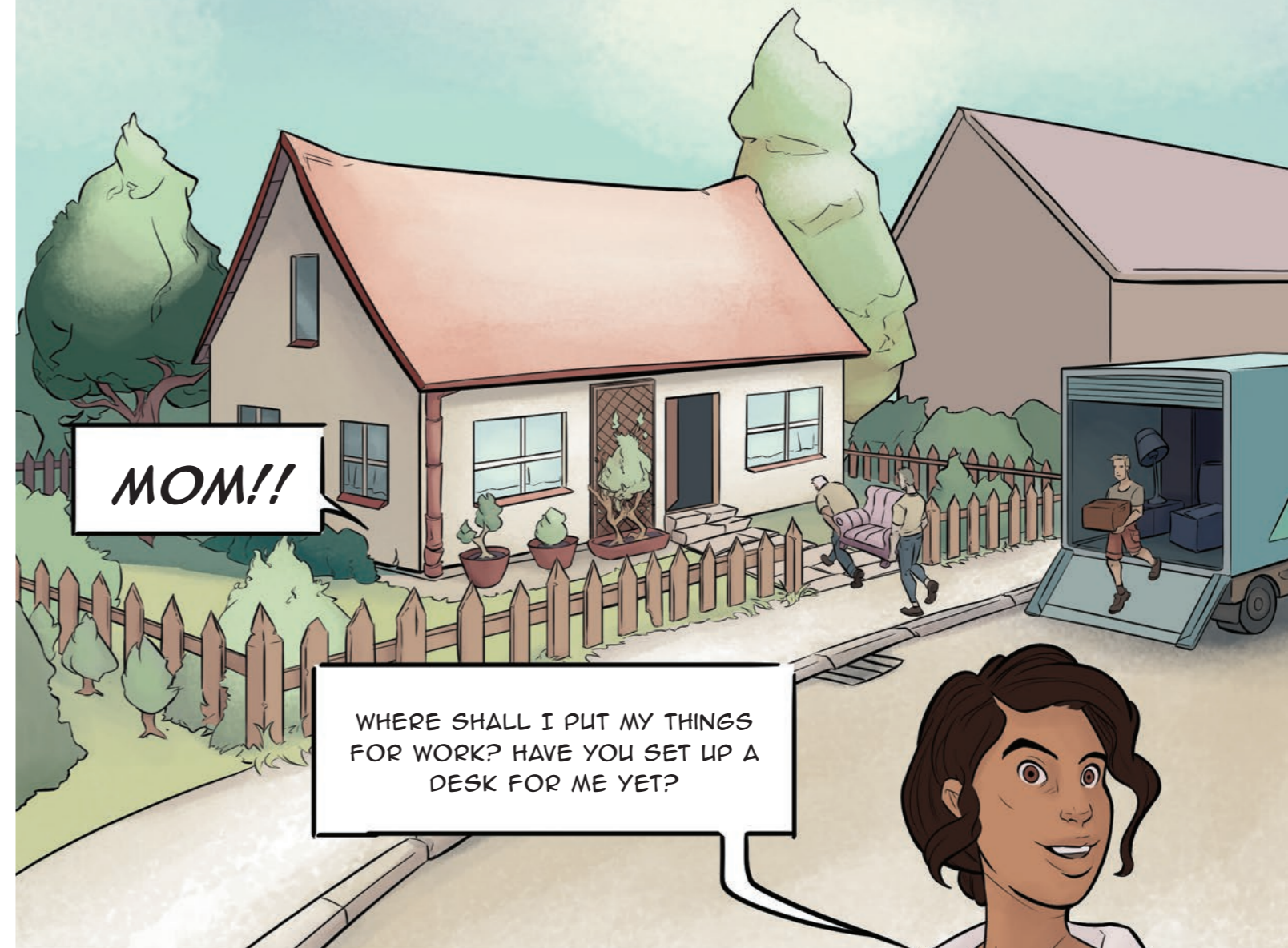
GUEST STARS

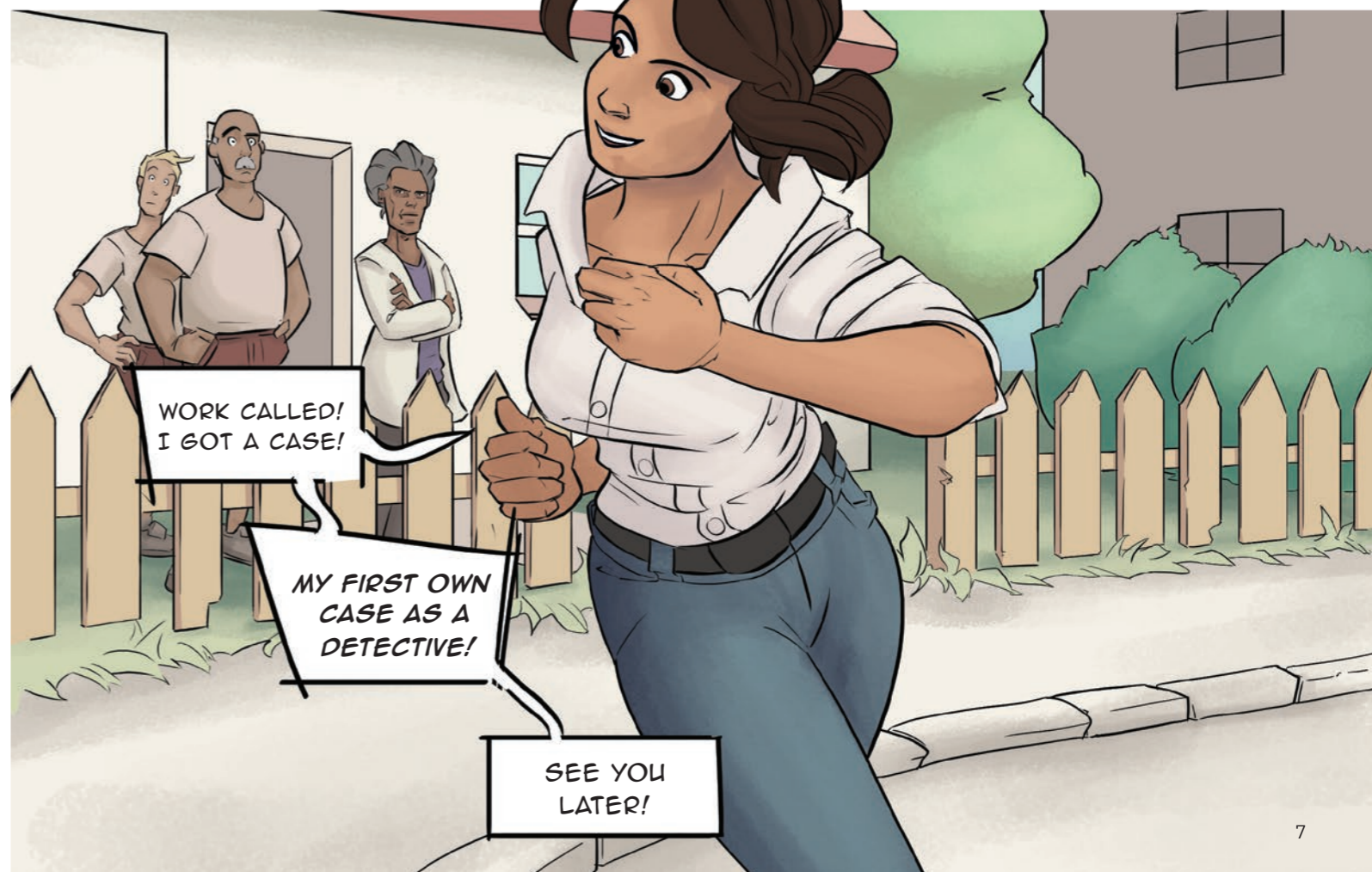
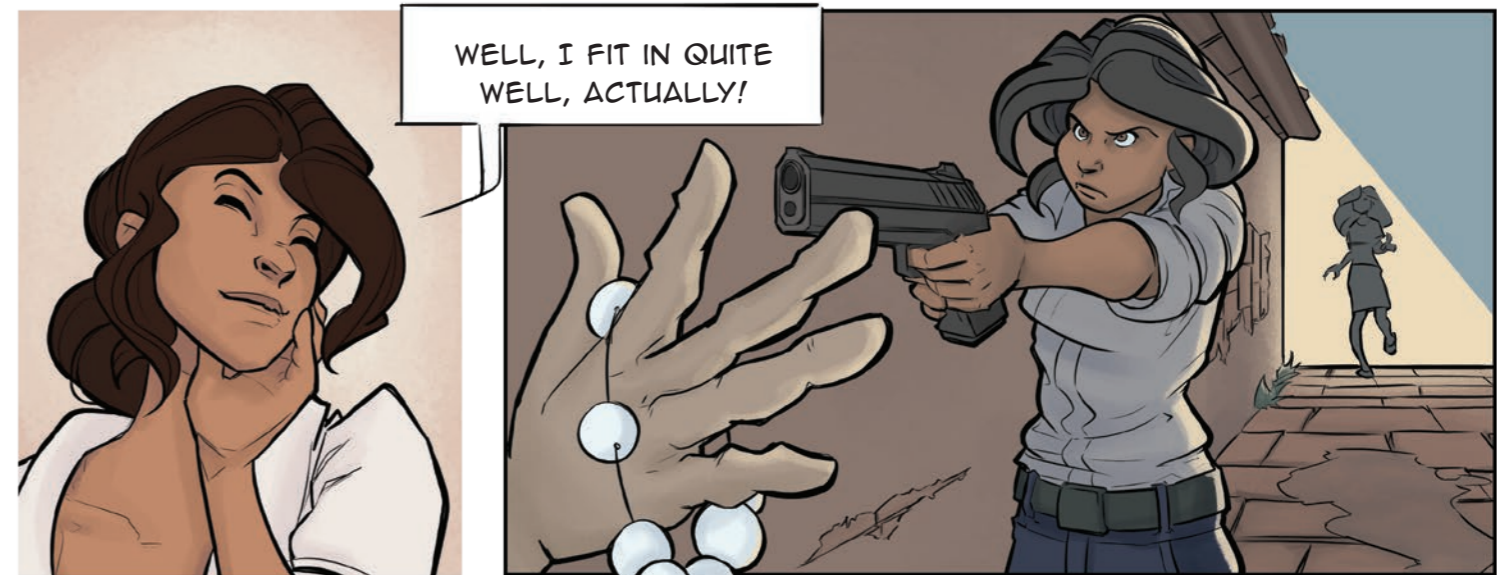
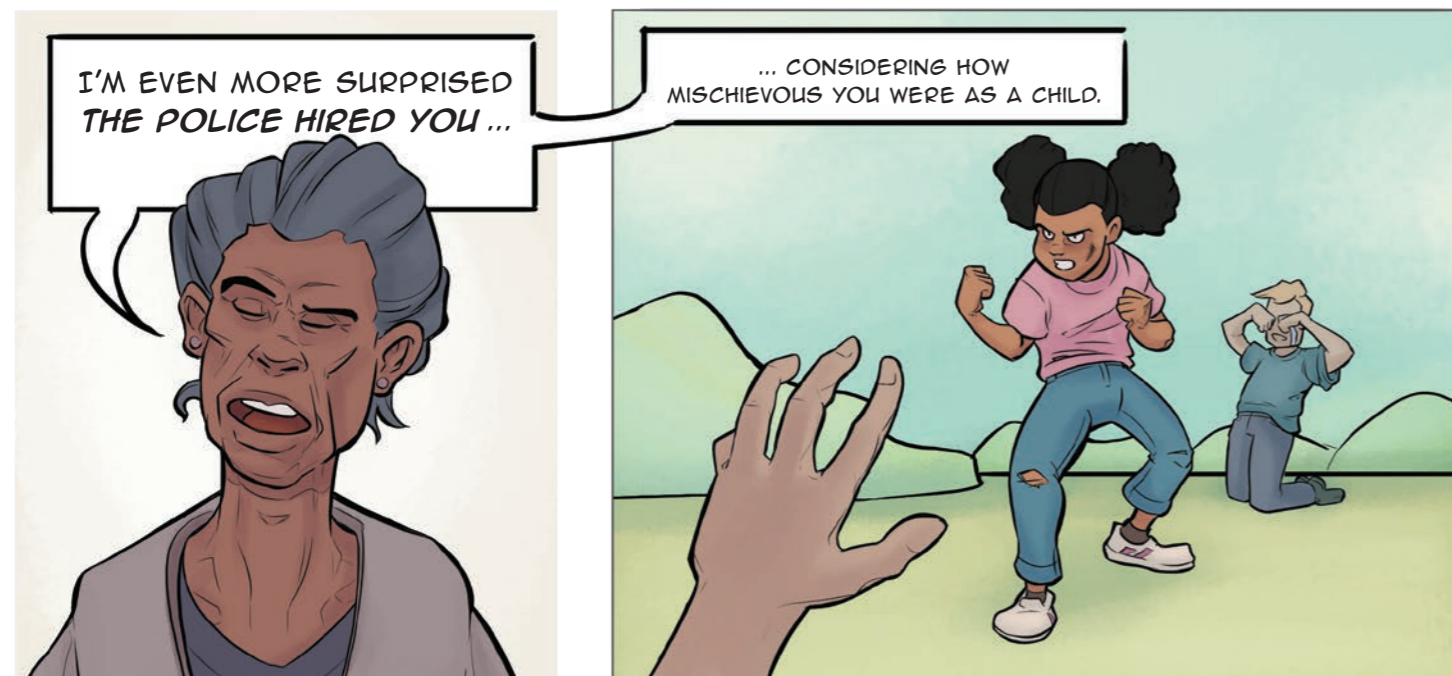
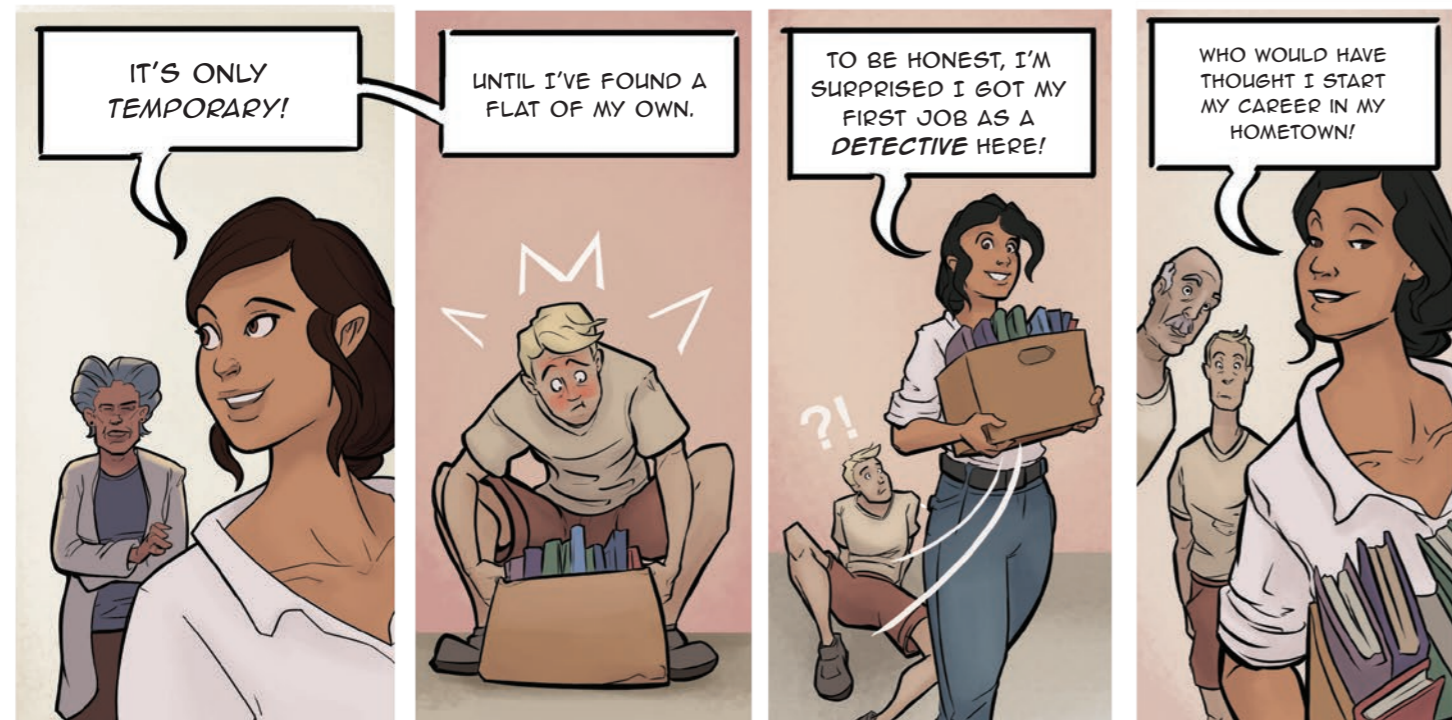
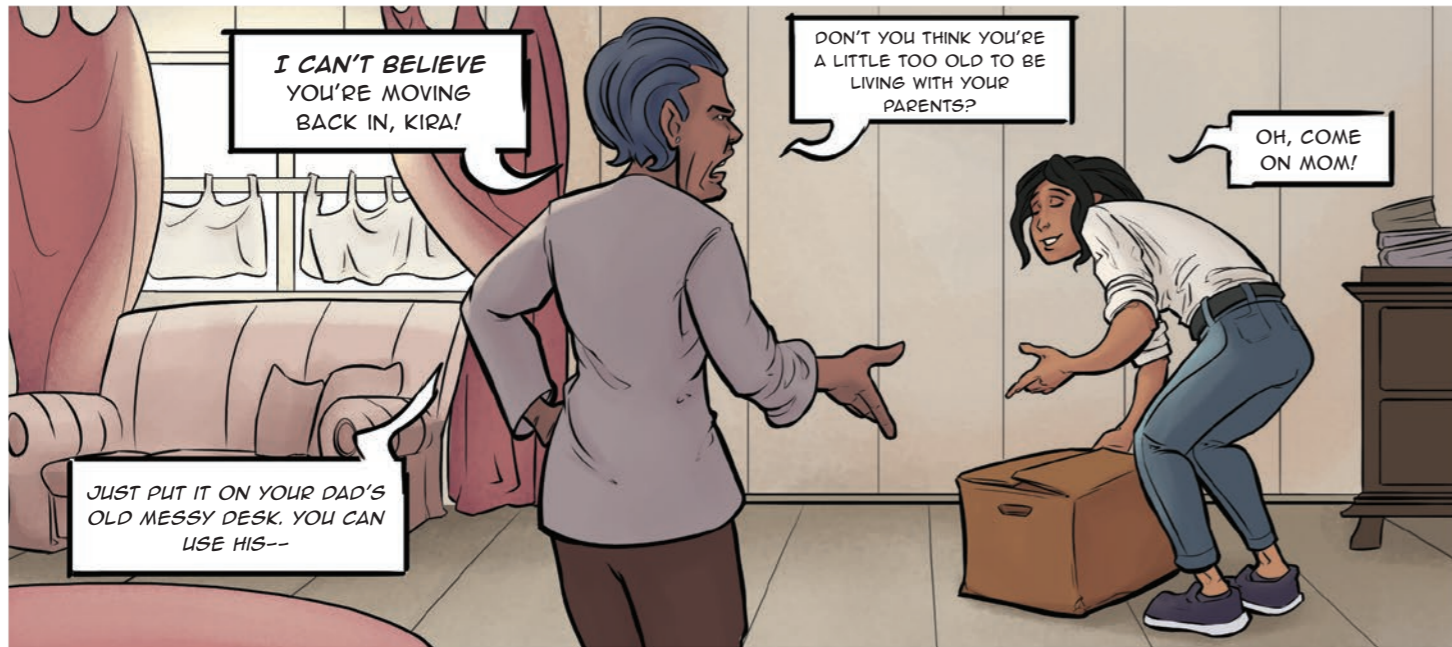


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Dr. Maria Röder-Tzellos
as **Sabine & Maria**
AGYA Coordination



Dr. Dominik L. Michels
as **Prof. Michels**
Expert on simulations
and AI, AGYA member







SO, WE THOUGHT, THIS IS THE IDEAL JOB FOR OUR NEW HIGHLY SKILLED DETECTIVE!

FIND CLUES NO ONE ELSE CAN!

GREAT! THANKS FOR TAKING CARE OF THIS. LET US KNOW IF YOU REQUIRE ANYTHING! BYE!

OF COURSE!



DETECTIVE KIRA, REPORTING FOR DUTY. WHAT'S GOING ON?

OH GREAT! YOU MADE IT, DETECTIVE!

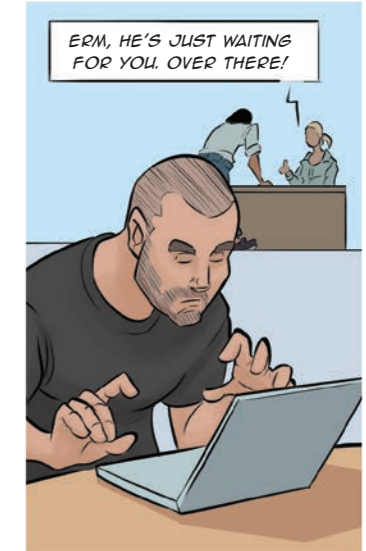


FINE! I'LL SHOW YOU GUYS. JUST YOU WAIT!



HI! I'M DETECTIVE KIRA! I'M THE ONE WHO WILL CATCH YOUR THIEF!

WHO'S IN CHARGE HERE?!



ERM, HE'S JUST WAITING FOR YOU. OVER THERE!

... IT'S DIFFICULT UNDERSTANDING THESE ACADEMICS WHEN THEY TALK ABOUT THEIR WORK.

LAST NIGHT, A DEVICE WAS STOLEN AT THIS INSTITUTE FULL OF SCIENTISTS. THEY SAY IT'S SOME KIND OF ROBOT ...

EITHER WAY ... **NOTHING** WAS CAUGHT ON CAMERA. **NO SIGNS** OF A BREAK-IN. ALSO, **NOBODY** WAS AT THE INSTITUTE THAT NIGHT.

SO, I'M NOT SURE WHAT WE CAN DO ...

AT LEAST, THAT'S WHAT WE TOLD THEM. BUT THEY INSISTED, WE INVESTIGATE!

IT'S **IMPORTANT!** **HIGH PRIORITY,** THEY SAID!



HI! I'M THE DETECTIVE YOU REQUESTED. I'M HERE TO INVESTIG--



ERRR, HELLO?!



OH?!



HI! I'M PROF. KORN! GREAT TO MEET YOU! SORRY, I DIDN'T SEE YOU THERE!

LET'S GO! THE OTHERS ARE ALREADY WAITING!

Read the rest of the comic online:

<https://affective-lab.org/social-robots-a-science-comic/> [English]

<https://affective-lab.org/de/soziale-roboter-ein-science-comic/> [German]

or get a printed copy at:

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SCIENCE REFERENCES

- [1] Acemoglu, D. and Restrepo, P. 2019. Robots and Jobs: Evidence from US Labor Markets. *Journal of Political Economy*. 128, 6 (Aug. 2019), 2188–2244. DOI: <https://doi.org/10.1086/705716>.
- [2] Arab-German Young Academy: <http://agya.info/>. Accessed: 2019-02-26.
- [3] Bartneck, C. et al. 2006. The influence of people's culture and prior experiences with Aibo on their attitude towards robots. *AI & SOCIETY*. 21, (May 2006), 217–230. DOI: <https://doi.org/10.1007/s00146-006-0052-7>.
- [4] Bloom, D.E. and Canning, D. 2004. Global Demographic Change: Dimensions and Economic Significance. Technical Report #10817. National Bureau of Economic Research. DOI: <https://doi.org/10.3386/w10817>.
- [5] Broekens, J. et al. 2009. Assistive social robots in elderly care: A review. *Gerontechnology*. 8, 2 (2009), 94–103. DOI: <https://doi.org/10.4017/gt.2009.08.02.002.00>.
- [6] Cameron, J. 1984. *The Terminator*. Cinema '84, Euro Film Funding, Hemdale.
- [7] Chemali, Z. et al. 2019. Burnout among healthcare providers in the complex environment of the Middle East: a systematic review. *BMC Public Health*. 19, 1 (Oct. 2019), 1337. DOI: <https://doi.org/10.1186/s12889-019-7713-1>.
- [8] Costa, S. et al. 2015. Using a Humanoid Robot to Elicit Body Awareness and Appropriate Physical Interaction in Children with Autism. *International Journal of Social Robotics*. 7, 2 (Apr. 2015), 265–278. DOI: <https://doi.org/10.1007/s12369-014-0250-2>.
- [9] Enright, P.L. et al. 1996. Prevalence and Correlates of Snoring and Observed Apneas in 5,201 Older Adults. *Sleep*. 19, 7 (Sep. 1996), 531–538. DOI: <https://doi.org/10.1093/sleep/19.7.531>.
- [10] Gerłowska, J. et al. 2018. Assessment of Perceived Attractiveness, Usability, and Societal Impact of a Multimodal Robotic Assistant for Aging Patients With Memory Impairments. *Frontiers in Neurology*. 9, (2018). DOI: <https://doi.org/10.3389/fneur.2018.00392>.
- [11] de Graaf, M.M.A. 2016. An Ethical Evaluation of Human–Robot Relationships. *International Journal of Social Robotics*. 8, 4 (Aug. 2016), 589–598. DOI: <https://doi.org/10.1007/s12369-016-0368-5>.
- [12] Affectiva: <https://www.affectiva.com/>. Accessed: 2020-09-14.
- [13] Huijnen, C.A.G.J. et al. 2016. Matching Robot KASPAR to Autism Spectrum Disorder (ASD) Therapy and Educational Goals. *International Journal of Social Robotics*. 8, 4 (Aug. 2016), 445–455. DOI: <https://doi.org/10.1007/s12369-016-0369-4>.
- [14] Human–Robot Intimate Relationships: <https://www.springerprofessional.de/en/human-robot-intimate-relationships/16466806>. Accessed: 2020-09-28.
- [15] Jensen, E.A.G. et al. 2019. Social Robots, Robotic Assistants, and Home Health Monitoring Devices: A Gerontological Research Perspective. *Research in Gerontological Nursing*. 12, 4 (Jul. 2019), 163–166. DOI: <https://doi.org/10.3928/19404921-20190612-02>.
- [16] Kahn, P.H. et al. 2013. Children's Social Relationships With Current and Near-Future Robots. *Child Development Perspectives*. 7, 1 (2013), 32–37. DOI: <https://doi.org/10.1111/cdep.12011>.
- [17] Kaspar the social robot: <https://www.herts.ac.uk/kaspar/the-social-robot>. Accessed: 2020-09-14.
- [18] Korn, O. et al. 2018. Perspectives on Social Robots: From the Historic Background to an Experts' View on Future Developments. *Proceedings of the 11th Pervasive Technologies Related to Assistive Environments Conference (New York, NY, USA, Jun. 2018)*, 186–193. DOI: <https://doi.org/10.1145/3197768.3197774>.
- [19] Korn, O. ed. 2019. *Social Robots: Technological, Societal and Ethical Aspects of Human-Robot Interaction*. Springer International Publishing. DOI: <https://doi.org/10.1007/978-3-030-17107-0>.
- [20] Korn, O. et al. 2021. Understanding Cultural Preferences for Social Robots: A Study in German and Arab Communities. *ACM Transactions on Human-Robot Interaction*.
- [21] Kubrick, S. 1968. 2001: A Space Odyssey. Metro-Goldwyn-Mayer (MGM), Stanley Kubrick Productions.
- [22] McGlynn, S. et al. 2014. Therapeutic Robots for Older Adults: Investigating the Potential of PARO. *Proceedings of the 2014 ACM/IEEE International Conference on Human-robot Interaction (New York, NY, USA, 2014)*, 246–247. DOI: <https://doi.org/10.1145/2559636.2559846>.
- [23] Mohammad, Y. and Nishida, T. 2015. *Data Mining for Social Robotics: Toward Autonomously Social Robots*. Springer International Publishing. DOI: <https://doi.org/10.1007/978-3-319-25232-2>.
- [24] Moyle, W. et al. 2019. "She Had a Smile on Her Face as Wide as the Great Australian Bite": A Qualitative Examination of Family Perceptions of a Therapeutic Robot and a Plush Toy. *The Gerontologist*. 59, 1 (Jan. 2019), 177–185. DOI: <https://doi.org/10.1093/geront/gnx180>.
- [25] Ong, A.D. et al. 2016. Loneliness and Health in Older Adults: A Mini-Review and Synthesis. *Gerontology*. 62, 4 (2016), 443–449. DOI: <https://doi.org/10.1159/000441651>.
- [26] PARO Therapeutic Robot: <http://www.parorobots.com/>. Accessed: 2020-11-17.
- [27] Pollack, M.E. et al. 2002. Pearl: A Mobile Robotic Assistant for the Elderly.
- [28] Portoghese, I. et al. 2014. Burnout and Workload Among Health Care Workers: The Moderating Role of Job Control. *Safety and Health at Work*. 5, 3 (Sep. 2014), 152–157. DOI: <https://doi.org/10.1016/j.shaw.2014.05.004>.
- [29] Prakash, A. et al. 2013. Older adults' medication management in the home: How can robots help? 2013 8th ACM/IEEE International Conference on Human-Robot Interaction (HRI) (Mar. 2013), 283–290. DOI: <https://doi.org/10.1109/HRI.2013.6483600>.
- [30] RIBA Official Page RIKEN-TRI Collaboration Center for Human-Interactive Robot Research (RTC): <http://rtc.nagoya.riken.jp/RIBA/index-e.html>. Accessed: 2020-09-14.
- [31] Šabanović, S. et al. 2013. PARO robot affects diverse interaction modalities in group sensory therapy for older adults with dementia. *IEEE ... International Conference on Rehabilitation Robotics: [proceedings]*. 2013, (Jun. 2013), 6650427. DOI: <https://doi.org/10.1109/ICORR.2013.6650427>.
- [32] Salyers, M.P. et al. 2017. The Relationship Between Professional Burnout and Quality and Safety in Healthcare: A Meta-Analysis. *Journal of General Internal Medicine*. 32, 4 (Apr. 2017), 475–482. DOI: <https://doi.org/10.1007/s11606-016-3886-9>.
- [33] Sandberg, A. 2013. An Overview of Models of Technological Singularity. *The Transhumanist Reader*. M. More and N. Vita-More, eds. Wiley. 376–394.
- [34] Shanahan, M. 2015. *The Technological Singularity*. MIT Press.
- [35] Smids, J. et al. 2020. Robots in the Workplace: a Threat to—or Opportunity for—Meaningful Work? *Philosophy & Technology*. 33, 3 (Sep. 2020), 503–522. DOI: <https://doi.org/10.1007/s13347-019-00377-4>.
- [36] Social Robots and Empathy: The Harmful Effects of Always Getting What We Want: 2019. <https://montrealethics.ai/social-robots-and-empathy-the-harmful-effects-of-always-getting-what-we-want/>. Accessed: 2020-09-28.
- [37] Tamura, T. et al. 2004. Is an Entertainment Robot Useful in the Care of Elderly People With Severe Dementia? *The Journals of Gerontology: Series A*. 59, 1 (Jan. 2004), M83–M85. DOI: <https://doi.org/10.1093/gerona/59.1.M83>.
- [38] The strong robot with the gentle touch | RIKEN: https://www.riken.jp/en/news_pubs/research_news/pr/2015/20150223_2/. Accessed: 2020-09-14.
- [39] Wachowski, L. and Wachowski, L. 1999. *The Matrix*. Warner Bros., Village Roadshow Pictures, Groucho Film Partnership.

THE AUTHORS

OLIVER KORN

Oliver Korn is a professor for Human Computer Interaction and director of the Affective & Cognitive Institute (ACI) at Offenburg University in Germany. He is a Senior Member of the Association of Computing Machinery (ACM), Professional Member of the IEEE, certified project manager (IHK) and a member of the Arab-German Young Academy (AGYA).

Next to social robots his research focuses on context-aware systems, assistive technology, affective computing, and gamification. In the ACI he bundles these areas together with an interdisciplinary team of researchers. Research results are documented in numerous publications, for example in ACM CHI, ASSETS, EICS, PETRA. He is the editor of the Springer-books Game Dynamics (2017) and Social Robots (2019). From 2018 to 2020 he was the program chair of the main European conference on assistive technologies, the ACM PETRA.

He and his team are especially passionate about communicating research results to the general public – the so called “third mission”. Thus, the idea for this comic came up.

JONAS GRUND

Jonas Grund works as a research associate at the ACI. Before that, he studied Media Art at the Bauhaus University in Weimar, Germany.

The personal experiences from his entry in the world of research fed his work at the comic. When designing and narrating the comic, it was important to him to illustrate even complex relations and demanding ethical problems in a way that people outside the scientific community could easily access it.