The Role of Culture in Early Expansions of Humans (Frankfurt and Tübingen)
Annual Report for 2015

The genus *Homo* spread from Africa to Asia and Europe in several waves of migration during the last 2 million years. While the habitat for australopithecines, early humans and other animals was limited by natural conditions, cultural achievements over the course of humanization permitted new ways of adapting to the environment. The Research Center "The Role of Culture in Early Expansions of Humans" (ROCEEH) asks the pivotal question: When, where, and in what form did the interplay of changing environmental conditions, biological evolution and cultural development allow the genus Homo to move beyond the behavioral niche of a large African ape? How did Homo succeed in expanding not only culturally, but also into ecologically defined niches beyond Africa? The project aims to reconstruct the spatio-temporal and phylogenetic expansion of the various hominin species, the expansion of ecological environment, as well as the expansion of cultural capacities between 3 million and 20,000 years before present, while shedding light on their causal relationship. The project focuses particular attention on the development of human capacities for cultural activities, their backgrounds and actual occurrences. Archaeological excavations in Africa, Asia and Europe help deliver this important information. At the core of the project is the interdisciplinary, web-based georelational database known as ROAD (ROCEEH Out-of-Africa Database) with complete GIS functionality. ROAD unifies geographical data about localities with additional information about the stratigraphical structure of layers and the archaeology they contain. In addition, ROAD assimilates information on human fossil history, climate, as well as flora and fauna, and then uses this information to model early human habitats. The results are integrated into a digital atlas detailing the development of humans and environment on the basis of a geographical information system (GIS).

Started in 2008 and projected to run for 20 years, ROCEEH is an interdisciplinary research project at the interface between natural and cultural sciences. This far-reaching, international, scientific research is carried out by a team of archaeologists, paleoanthropologists, paleobiologists, geographers and database specialists situated at the Senckenberg Research Institute in Frankfurt and the University of Tübingen.

Members of the Scientific Commission: regular members of the Academy, Karl Fuchs (Karlsruhe), Hermann H. Hahn (chairman, Karlsruhe), Lothar Ledderose (Heidelberg), Joseph Maran (Heidelberg), Ekkehard Ramm (Stuttgart); as well as Prof. Dr. Ofer Bar-Yosef (Harvard), Prof. Dr. Zvi Ben-Avraham (Tel Aviv), Prof. Dr. Manfred Ehlers (Osnabrück), Prof. Dr. Bernhard Eitel (Heidelberg), Prof. Dr. Jürgen Richter (Köln), Prof. Dr. Wulf Schiefenhövel (Andechs), Prof. Dr. Mark Stoneking (Leipzig), Prof. Dr. Chris Stringer (London).

Heads of the Research Center: Prof. Dr. Friedemann Schrenk (Frankfurt), Volker Mosbrugger (Frankfurt), Nicholas Conard (Tübingen), Prof. Dr. Volker Hochschild (Tübingen)

Research staff: in Frankfurt, Priv.-Doc. Dr. Angela Bruch, Claudia Groth, Priv.-Doc. Dr. Miriam Haidle (project coordinator), Dr. Christine Hertler, Dipl.-Biol. Julia Hess (administrative coordinator); in Tübingen, apl. Prof. Dr. Michael Bolus, Dipl.-Inf. Zara Kanaeva, Dr. Andrew Kandel, Maria Malina, Dr. habil. Michael Märker.

Guests of the Research Center in 2015: Dr. Anne-Marie Bacon (Paris, France), Dr. Guido Bataille (Cologne), Prof. Dr. Jamie Clark (Fairbanks, USA), Rimtautas Dapschauskas M.A. (Jena), Dr. David Friesem (Cambridge, England), Robert Ghukasyan M.A. (Yerevan, Armenia), Dr. Uwe Kirscher (Munich), Tina Lüdecke (Frankfurt), Prof. Dr. Anthony Marks (Dallas, USA), Trine Kellberg Nielsen (Århus, Denmark), Dr. Vitaly Usik (Kiev, Ukraine). Additionally, the research center hosted two Humboldt Fellows, Dr. Hanneke Meijer (Leiden, The Netherlands) and Prof. Dr. Martin Porr (Crawley, Australia), as well as the recipient of a Humboldt Prize, Prof. Dr. David Lordkipanidze (Tbilisi, Georgia), who all undertook research in connection with the ROCEEH Research Center.

Key aspects

During ROCEEH's eighth year of research, the Research Center focused its efforts on summarizing different types of expansion that occurred over the course of human evolution. The members of the Research Center presented and discussed these ideas at an international conference organized by ROCEH, "Expansions2015" (see meeting report). For the past few years, ROCEEH has been developing an integrative concept: "Becoming Human" (Fig. 1). Instead of merely looking for a single cause of expansion and its sole solution, ROCEEH

promoted this concept to focus on the systemic understanding of the changing dynamics and variable interactions of many competing factors. Over the course of human history, hominins have expanded not only with regard to their geography (*expansion of range*) as new species or groups appeared, but also in their ability to shape their cultural behavior (*expansion of hominin performance*). By exploiting and also broadening their use of existing habitats, hominins changed the resource spectrum that they could tap (*expansion of resource space*). By increasing the habitats they exploited, and with it, their potential (*expansion of ecospace*), hominins followed the dynamics of global environmental change. While the *ecospace* of a hominin group is defined by its geographic distribution and its climate, vegetation, landscape and fauna, the exploited *resource space* of hominins can be identified through their interaction with the environment and includes such varied elements as subsistence, raw material, tools, competition and carnivores.

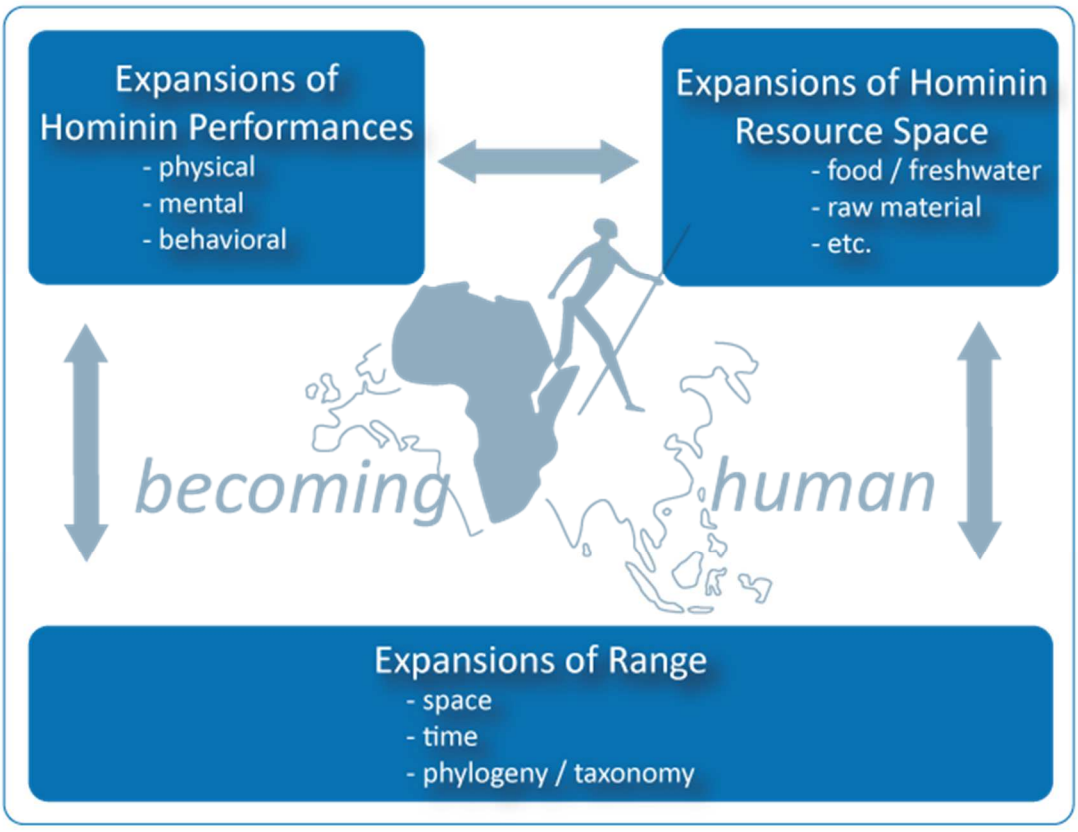


Fig. 1 ROCEEH‘s systemic concept of “Becoming Human” showing interaction of performances, resource space and expansion.

The interplay of different hominin species with their environment occurs through differing processes of life expression (performances, such as perception, subsistence, artifact manufacture). During this process, physical, mental and behavioral aspects play a role in

differing proportions. The forms of performance are developed with contributions from three developmental dimensions: i) evolutionary-biological; ii) ontogenetic-individual; and iii) historical-social. The third dimension is solely a characteristic of cultural performance and occurs as an increasingly self-perpetuating process. The development of cultural performance results from interaction with the environment and resource space: performances can unlock resources, enhance or limit their occurrence, and create new resources, for example, in the form of artifacts; on the other hand, elements of resource space can enable or restrict performances. The reciprocal performances establish relationships between individual hominin species and elements of their resource space. The change in the totality of these relationships (i.e., among which elements they occur, in what form, and for how long, as well as to which predetermination, variability and flexibility) is a central point in understanding the degree to which cultural process play a role in early human expansions. The goal of the systemic concept developed by ROCEEH is to examine "Becoming Human" and the intrinsic hominin expansions not only as a geographic phenomenon, but also from environmental, cultural-behavioral, physical and cognitive perspectives. ROCEEH aims to integrate all of these different perspectives with one another and understands them as complementary in their interactions. In 2015 we introduced a part of the concept in the eight-grade EECC model of the evolution and expansion of cultural capacities (Haidle et al. 2015).

To illuminate and test its concepts about the different aspects of "Becoming Human", ROCEEH conducts field projects, initiates problem-based case studies about issues related to cultural development, examines changes in ecospace and resource space, and explores the spatial expansion and changing relationships between these varied fields. In 2015, ROCEEH conducted field work in regions important to studying human development, such as South Africa, East Africa, the Levant, the Caucasus and Europe, as well as initiating new projects in South and Southeast Asia. A thematic focus began: "Special conditions in an interglacial? A comparison of the relationship between humans and the environment in Europe from MIS 6 to MIS 5e." A new investigation examined the development of ocher use during the Middle Stone Age and Middle Paleolithic, while another study investigated composite technologies over 200,000 years. This research promises to yield exciting insights into the ways that humans increasingly overcame environmental constraints. In 2015 ROCEEH projects spanned from the beginnings of the genus *Homo* ("Paleoenvironment of Melka Kunture, Ethiopia"), through the expansion routes of a million years ago ("Detecting corridors into and out of the Caucasus"), to the rapid movements of *Homo sapiens* about 40,000 years ago ("Peopling the

Caucasus"). The research was also dedicated to developing new methods of reconstruction ("Climate reconstruction based on fossil communities of small mammals and plants") as well as modeling ("The Out-of-Africa concept based on agent-based modeling"). Newsletters providing current information on these themes can be accessed through ROCEEH's website (www.roceeh.net).

Field Work

In 2015 the staff of the Research Center conducted or participated in 11 field projects:

Africa:

- South Africa: Sibudu Cave, Umbelli belli (N. Conard, Excavation and analysis, 7 weeks)
- Ethiopia, Melka Kunture (M. Märker, 2 weeks)

Arabia:

- United Arabic Emirates: Jebel Faya; Suhailah (K. Bretzke, Excavation and survey, 3 weeks)

West Asia:

- Israel: Sefunim (A. Kandel, Excavation and analysis, 6 weeks)
- Iran: Ghar-e Boof (N. Conard, Excavation and analysis, 8 weeks)

Caucasus:

- Georgia: Kakheti (A. Bruch, F. Schrenk, Survey and sampling, 2 weeks)
- Armenia: Artsakh (A. Bruch, F. Schrenk, Survey and sampling, 2 weeks)
- Armenia: Aghitu-3 Cave (A. Kandel, Excavation and analysis, 4 weeks)

Europe:

- Germany: Hohle Fels near Schelkingen (M. Malina, N. Conard, Excavation, 8 weeks)
- Italy: Mugello (M. Märker, C. Hertler, Survey and field school, 2 weeks)

Southeast Asia:

- Indonesia: Majalengka and Sangiran, Java (C. Hertler, A. Bruch, Survey and sampling, 2 weeks)

ROCEEH Out-of-Africa Databaese (ROAD) and ROADWeb

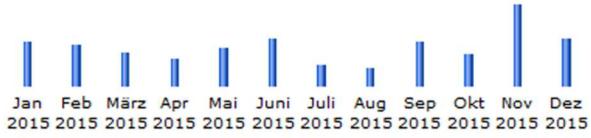
The ROAD system combines a PostgreSQL database with WebGIS libraries to enable full WebGIS functionality and includes map servers, Javascript and php scripts. ROAD is currently available to the public with limited user rights through the project website

(www.roceeh.net). At the end of 2015 datasets that incorporate geographical, stratigraphical, paleoecological, archaeological and bibliographical information had been entered into ROAD from 5209 assemblages at 955 localities; a total of 1508 sites are now included.

In 2015 ROADWeb was further developed to improve the needs of data entry, data control and data use. A significant part of this development was the implementation of new "Insert/Update" masks. The user friendliness of ROADWeb was also improved, e.g., users can now print out geological profiles of localities. The project to connect the Neogene Quaternary Mammals Database with ROAD, managed through a partnership with the Centro Nacional de Investigación sobre la Evolución Humana (CENIEH, Burgos/Spain), began in 2014 and was successfully completed in 2015. The preparation of an Application Programing Interface (API) and a software environment for the implemented API included authorization for search (on both the server and client sides), insertion of an access query window in the API (a query mask), representation of the search results in map form, as well as in tables. The selection of mapped results from an external search of a map (features) was also implemented. Finally, a software package was written to quantify the number of hits on ROCEEH's servers, making it possible to report these statistics and plot the results on a map (Fig 2a, b).

Zugriffsstatistik für
www.roceeh.uni-tuebingen.de
Zeitraum: 2015 Januar-Dezember

Monatliche Historie



Monat	Seiten
Jan 2015	53,651
Feb 2015	48,532
März 2015	40,910
Apr 2015	32,071
Mai 2015	45,151
Juni 2015	57,200
Juli 2015	24,991
Aug 2015	21,603
Sep 2015	53,672
Okt 2015	36,467
Nov 2015	96,880
Dez 2015	57,233
Total	568,361

Fig 2a Statistics of hits on ROCEEH's servers, January-December 2015

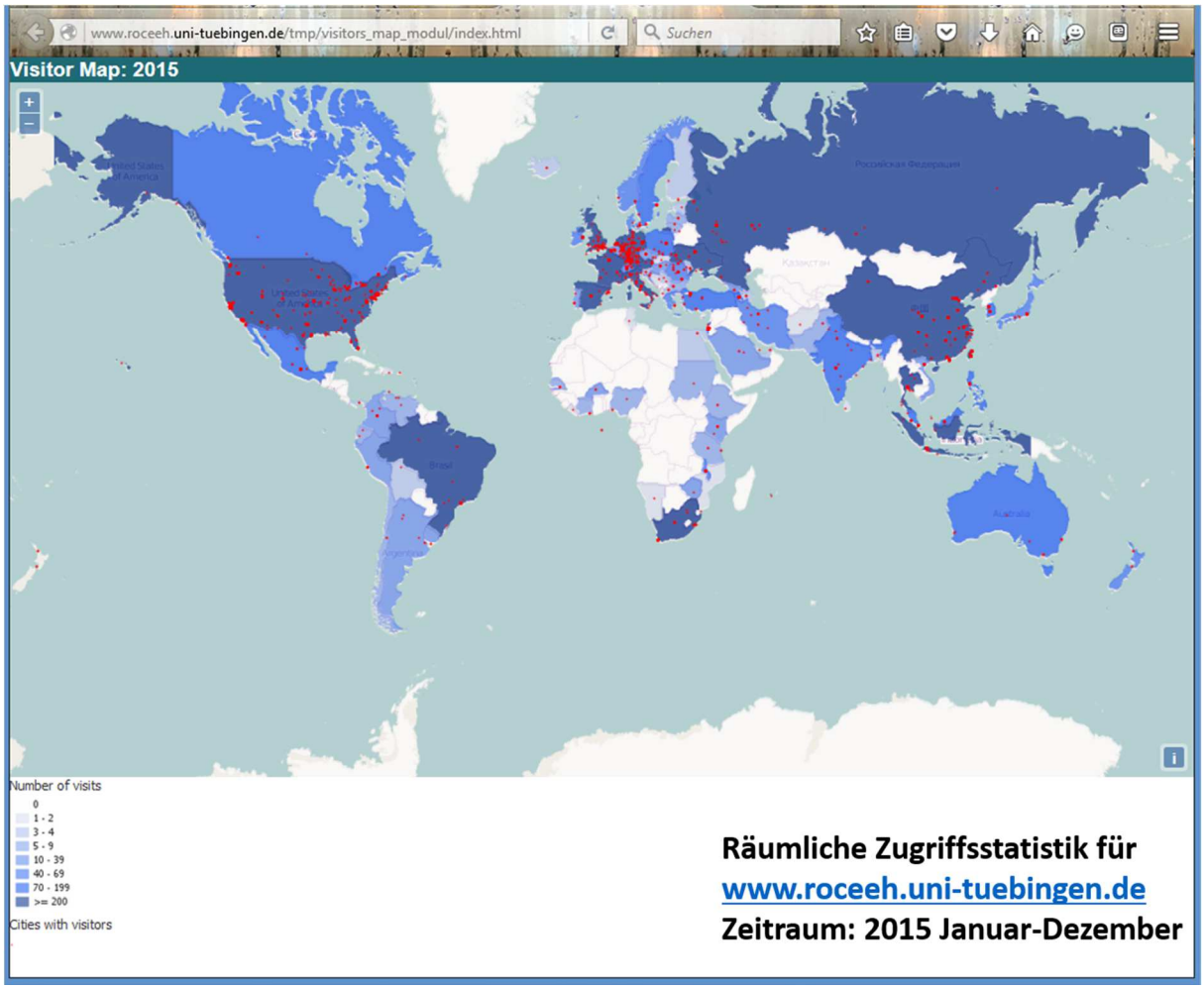


Fig 2 b Spatial statistics of hits on ROCEEH's servers, January-December 2015

Project relevant conference contributions and lectures by research staff

The project staff participated in 23 conferences. They organized the international conference "Expansions2015", as well as three conference sessions and workshops, were lead or contributing authors in 32 lectures and presented five posters. They also introduced the project or their work four times at work meetings, lecture series, and in the *Studium Generale*.

Third Party Funding

To complement the financing provided by the Academy, additional funds were sought for case studies, regional investigations and visits from guest researchers and young academics. ROCEEH received additional support from the Leakey Foundation, the German Research Council (DFG), the International Research Staff Exchange Scheme (IRSES) of the European Union, the Irene Levi Sala Care Archaeological Foundation, and the Leibniz Association.

Teaching

In addition to their research activities, the staff strive to impart students with the benefits and results of their work and support graduate and postgraduate students in their qualifications:

- Lectures and seminars at the University of Frankfurt/Main: Angela Bruch, Christine Hertler
- Lectures and seminars at the University of Tübingen: Michael Bolus, Angela Bruch, Miriam Haidle, Michael Märker
- Supervision of Master's, Diploma and Doctoral theses: Michael Bolus, Angela Bruch, Miriam Haidle, Christine Hertler, Andrew Kandel, Michael Märker
- Supervision of archaeotechnical trainees: Maria Malina

Project relevant publications by research staff and principal investigators

A total of 51 project relevant publications appeared in 2015 in which the principal investigators and staff of the Research Center played a leading or contributing role:

ISI-listed publications:

1. Bachofer F., Quénéhervé G., Hochschild V., Märker, M. (2015): Multisensoral topsoil mapping in the semiarid Lake Manyara region, Northern Tanzania. Remote Sensing 7(8), 9563-9586.
2. Bachofer, F., Quénéhervé, G., Märker, M., Hochschild, V. (2015): Comparison of SVM and boosted regression trees for the delineation of lacustrine sediments using multispectral ASTER data and topographic indices in the Lake Manyara basin. Photogrammetrie, Fernerkundung und Geoinformation 1, 81-94.
3. Baines, J.A., Riehl, S., Conard, N.J., Zeidi-Kulehparcheh, M. (2015): Upper Palaeolithic archaeobotany of Ghar-e Boof cave, Iran: a case study in site disturbance and methodology. Archaeological and Anthropological Sciences 7, 245-256.
4. Bromage, G.B., Hogg, R.T., Lacruz, R.S., Crenshaw, T.D., Schrenk, F. (2015): Hard tissue maintain a record of whole body metabolism and enlighten the metabolomics of development and life history. American Journal of Physical Anthropology 156, 93-93.
5. Bruch, A.A., Hertler, C., Maerker, M., Schrenk, F. (2015): Quantifying hominin ecospace to reconstruct early hominin dispersal routes. American Journal of Physical Anthropology 156, 94-95.
6. Casas Gallego, M., Lassaletta, L., Barrón, E., Bruch, A.A., Montoya, P. (2015): Vegetation and climate in the eastern Iberian Peninsula during the pre-evaporitic Messinian (latest Miocene). Palynological data from the upper Turolian of Venta del Moro (Spain). Review of Palaeobotany and Palynology 215, 85-99.
7. Conard, N.J., Bolus, M. (2015): Chronicling modern human's arrival in Europe. Science 348, 754-756.

8. Conard, N.J., Starkovich, B.M. (2015): Bone taphonomy of the Schöningen “Spear Horizon South” and its implications for site formation and hominin meat provisioning. Journal of Human Evolution 89, 154-171.
9. Conard, N.J., Will, M. (2015): Examining the causes and consequences of short-term behavioral change during the Middle Stone Age at Sibudu, South Africa. PLoS ONE 10(6), e0130001.
10. Conard, N.J., Serangeli, J., Böhner, U., Starkovich, B.M., Miller, C.E., Urban, B., van Kolfschoten, T. (2015): Excavations at Schöningen and paradigm shifts in human evolution. Journal of Human Evolution 89, 1-17.
11. Flores, E., Quénéhervé G., Bachofer F., Shahzad F., Märker, M. (2015): Morpho-tectonic interpretation of the Makuyuni catchment in Northern Tanzania using DEM and SAR data. Geomorphology 248, 427-439.
12. Haidle, M.N., Bolus, M., Collard, M., Conard, N.J., Garofoli, D., Lombard, M., Nowell, A., Tennie, C., Whiten, A. (2015): The Nature of Culture: an eight-grade model for the evolution and expansion of cultural capacities in hominins and other animals. Journal of Anthropological Sciences 93, 43-70.
13. Julien, M.A., Hardy, B., Stahlschmidt, M.C., Urban, B., Serangeli, J., Conard, N.J. (2015): Characterizing the Lower Paleolithic bone industry from Schöningen 12 II: A multi-proxy study. Journal of Human Evolution 89, 264-286.
14. Julien, M.-A., Rivals, F., Serangeli, J., Bocherens, H., Conard, N.J. (2015): A new approach for deciphering between single and multiple accumulation events using intra-tooth isotopic variations: Application to the Middle Pleistocene bone bed of Schöningen 13 II-4. Journal of Human Evolution 89, 114-128.
15. Kyriacou, K., Parkington, J.E., Will, M., Kandel, A.W., Conard, N.J. (2015): Middle and Later Stone Age shellfish exploitation strategies and coastal foraging at Hoedjiespunt and Lynch Point, Saldanha Bay, South Africa. Journal of Archaeological Science 57, 197-206.
16. Quénéhervé, G., Bachofer F., Märker, M. (2015): Experimental assessment of runoff generation processes on hillslope scale in a semiarid region in Northern Tanzania. Geografia Fisica e Dinamica Quaternaria 38(1), 55-66.
17. Reyes-Centeno, H., Mentzer, S.M., Kandel, A.W. (2015): Fourth annual meeting of the European Society for the study of human evolution. Evolutionary Anthropology 24, 1-2.
18. Riehl, S., Marinova-Wolff, E., Deckers, K., Malina, M., Conard, N.J. (2015): Plant use and local vegetation patterns during the second half of the Late Pleistocene in southwestern Germany. Archaeological and Anthropological Sciences 7, 151-167.
19. Rivals, F., Julien, M.-A., Kuitems, M., van Kolfschoten, T., Serangeli, J., Drucker, D.G., Bocherens, H., Conard, N.J. (2015): Investigation of equid paleodiet from Schöningen 13 II-4 through dental wear and isotopic analyses: Archaeological implications. Journal of Human Evolution 89, 129-137.
20. Rots, V., Hardy, B.L., Serangeli, J., Conard, N. J. (2015): Residue and microwear analyses of the stone artifacts from Schöningen. Journal of Human Evolution 89, 298-308.
21. Schmidt, P., Porraz, G., Bellot-Gurlet, L., February, E., Ligouis, B., Paris, C., Texier, J. P., Parkington, J. E., Miller, C. E., Nickel, K. G., Conard, N.J. (2015): A previously undescribed organic residue sheds light on heat treatment in the Middle Stone Age. Journal of Human Evolution 85, 22-34.

22. Serangeli, J., Conard, N.J. (2015): The behavioral and cultural stratigraphic contexts of the lithic assemblages from Schöningen. Journal of Human Evolution 89, 287-297.
23. Serangeli, J., Böhner, U., van Kolfschoten, T, Conard, N.J. (2015): Overview and new results from large-scale excavations in Schöningen. Journal of Human Evolution 89, 27-45.
24. Stahlschmidt, M.C., Miller, C.E., Ligouis, B., Goldberg, P., Berna, F., Urban, B., Conard, N.J. (2015): The depositional environments of Schöningen 13 II-4 and their archaeological implications Journal of Human Evolution 89, 71-91.
25. Stahlschmidt, M.C., Miller, C.E., Ligouis, B., Hambach, U., Goldberg, P., Berna, F., Richter, D., Urban, B., Serangeli, J., Conard, N.J. (2015): On the evidence for human use and control of fire at Schöningen. Journal of Human Evolution 89, 181-201.
26. Volmer, R., Hertler, C., van der Geer, A. (2015): Niche overlap and competition potential among tigers (Panthera tigris), sabertoothed cats (Homotherium ultimum, Hemimachairodus zwierzyckii) and Merriam's dog (Megacyon merriami) in the Pleistocene of Java. Palaeogeography, Paleoclimatology, Palaeoecology 441(4), 901-911.
27. Will, M., Mackay, A., Phillips, N. (2015): Implications of Nubian-like core reduction systems in southern Africa for the identification of early modern human dispersals. PLoS ONE 10(6): e0131824.
28. Will, M., Stock, J.T. (2015): Spatial and temporal variation of body size among early Homo. Journal of Human Evolution 82, 15-33.
29. Zanolli, C., Grine, F.E., Kullmer, O., Schrenk, F., Macchiarelli, R. (2015): The early Pleistocene deciduous hominid molar FS-72 from the Sangiran dome of java, Indonesia: A taxonomic reappraisal based on its comparative endostructural characterization: The early Pleistocene deciduous hominid molar FS-72. American Journal of Physical Anthropology 157(4), 666-674.

Other peer reviewed publications:

30. Bolus, M. (2015): Dispersals of early humans: adaptations, frontiers, and new territories. In: W. Henke und I. Tattersall (Eds.), Handbook of Paleoanthropology, Bd. III. Berlin, Heidelberg: Springer, 2371-2400.
31. Bolus, M. (2015): The transition from the Middle to the Upper Paleolithic in the Swabian Jura, southwestern Germany. Anthropologie 53(1-2), 167-179.
32. Conard, N.J. (2015): Cultural evolution during the Middle and Late Pleistocene in Africa and Eurasia. In: W. Henke, I. Tattersall (Eds.), Handbook of Paleoanthropology, 2nd Edition. Berlin: Springer, 2465-2508.
33. Conard, N.J., Porraz, G. (2015): Revising models for the cultural stratigraphic sequence of the Middle Stone Age. South African Archaeological Bulletin 70, 127-130.
34. Garofoli, D. (2015): Neanderthal cognitive equivalence: Epistemological problems and a critical analysis from radical embodiment. Cognitive perspectives in tool behavior Vol. 2. Tübingen, tobias-lib, http://dx.doi.org/10.15496/publikation-5713
35. Heydari-Guran, S., Ghasidian, E., Conard, N.J. (2015): Middle Paleolithic Settlement on the Iranian Central Plateau. In: N. J. Conard, A. Delagnes (Eds.), Settlement Dynamics of the Middle Paleolithic and Middle Stone Age, Volume IV. Tübingen: Kerns Verlag, 171-203.

36. Haidle, M.N. (2015): Modeling the Past: Archaeology. In: W. Henke und I. Tattersall (Eds.), Handbook of Paleoanthropology, Bd. III. Berlin, Heidelberg: Springer, 846-864.
37. Schrenk, F., Kullmer, O., Bromage, T.G. (2015): The earliest putative Homo fossils. In: Henke, W. & Tattersall (Eds.), Handbook of Palaeoanthropology, 2nd Edition. Berlin: Springer, 2145-2165.

Publications without peer review:

38. Bolus, M. (2015): History of research and the Aurignacian of the sites in the Swabian Jura. In: N. Sanz (Ed.), Human Origin Sites and the World Heritage Convention in Eurasia, Bd. 1. UNESCO World Heritage Papers 41, 32-49.
39. Conard, N.J. (2015): Current research in caves of the Swabian Jura, the origins of art and music, and the outstanding universal value of the key sites. In: N. Sanz (Ed.), Human Origin Sites and the World Heritage Convention in Eurasia, Bd. 2. UNESCO World Heritage Papers 41, 6-16.
40. Conard, N.J., Floss, H., Haidle, M.N., Bolus, M. (Eds.), (2015): L. Giemsch, Makuyuni. Fundstellen des Acheuléen am Lake Manyara, Tansania. Ein Beitrag zur Erforschung der mittelpleistozänen Kultur in Ostafrika. Tübinger Arbeiten zur Urgeschichte 7. Rahden/Westf.: Verlag Marie Leidorf GmbH.
41. Conard, N.J., Serangeli, J. (2015): Les industries de Terra Amata et d'Allemagne au Pléistocène Moyen: Essai de comparaison. In: H. de Lumley (Ed.), Terra Amata, Nice, Alpes-Maritimes, France. Vol. IV. Les Industries acheuléennes, 771-775.
42. Haidle, M.N. (2015): Der Affe auf dem Motorrad. Die Rolle von Natur, Kultur und Umwelt bei der Evolution des Menschen. Verhandlungsband der 128. Versammlung der Gesellschaft Deutscher Naturforscher und Ärzte, Mainz 2014. Naturwissenschaftliche Rundschau 68(10), 42-46.
43. Münzel, S.C., Hein, W., Potengowski, F., Conard, N.J. (2015): Flötenklang aus fernen Zeiten: Die ältesten Blasinstrumente von der Schwäbischen Alb. In: R. Eichmann, L.-C. Koch (Eds.), Musikarchäologie: Klänge der Vergangenheit. Sonderheft ‚Archäologie in Deutschland'. Darmstadt: Wissenschaftliche Buchgesellschaft, 30-37.
44. Schrenk, F. (2015): Paläoanthropologie im Spannungsfeld von Wissenschaft und Geschichte. In: Heilinger, J.C. & Nida-Rümelin, J. (Eds.), Anthropologie und Ethik 12. Berlin: de Gruyter, 191-201.
45. Stolarczyk, R. (2015): Das Werkzeugverhalten der Schimpansen. Kognitive Variabilität, Flexibilität und Komplexität. Cognitive perspectives in tool behavior Vol. 3. Tübingen, tobias-lib. http://dx.doi.org/10.15496/publikation-8593

Popular publications:

46. Conard, N.J., Schmid, V.C., Will, M. (2015): Sibudu und die kulturelle Evolution des modernen Menschen. Archäologie in Deutschland 2/2015, 12–17.
47. Conard, N.J., Malina, M. (2015): Eine mögliche zweite Frauenfigurine vom Hohle Fels und Neues zur Höhlennutzung im Mittel- und Jungpaläolithikum. Archäologische Excavationen Baden-Württemberg 2014, 54-59.
48. Conard, N.J., Janas, A., Zeidi, Z. (2015): Neues aus dem Lonetal: Ergebnisse von Excavationen an der Fetzershaldenhöhle und dem Vogelherd. Archäologische Excavationen in Baden-Württemberg 2014, 59-64.

49. Conard, N.J., Bolus, M., Dutkiewicz, E., Wolf, S. (2015): Eiszeitarchäologie auf der Schwäbischen Alb. Die Fundstellen im Ach- und Lonetal und in ihrer Umgebung. Tübingen: Kerns Verlag.
50. Schrenk, F. (2015): Wie wurde der Mensch zum Menschen? zur debatte 6/2015, 20-22.
51. Schrenk, F., Sandrock, O. (2015): Expanding Worlds, In: Homo – Expanding Worlds. Darmstadt: Wissenschaftliche Buchgesellschaft, 33-43.