[](https://photos.app.goo.gl/BiLG4x3iEUxUMguc8)

| [home](https://arnoklein.info/index.html) | [cv](https://arnoklein.info/cv.html) | [mind](https://arnoklein.info/mind.html) | [brain](https://arnoklein.info/brain.html) | [design](https://arnoklein.info/design.html) |
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|  | Design & visualization |
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|  | **Optimal keyboard layouts**  I algorithmically design keyboard layouts optimized for different languages  (early example: [engram.dev](https://engram.dev)). I currently use a Bayesian preference learning model  to convert crowdsourced typing preference data into estimates of typing comfort. |
|  | **Cave temple photodocumentation**  My wife and I created the first comprehensive photodocumentation of the Buddhist, Hindu, and Jain cave temples of Ellora in India, with a database of over 7,000 photographs referenced against ground plans ([elloracaves.org](http://elloracaves.org)). This work was partly funded by grants from the Mellon Foundation and the Indian government. Mapin and Columbia University Press will publish our book by the end of 2025. |
|  | **Information visualization database**  I built the database and website [infovis.info](http://infovis.info) back in 2008 as part of work on graphical taxonomies. You can still search for information graphics from a curated set of over 1.000 examples, including networks, cyberspaces, data visualizations, cartograms, etc. |
|  | Publications |
|  | **A Klein**, KA Klein.  Birds on Chairs (12 illustrated short stories).  *Chicken in a Snowstorm Press* (2020). |
|  | **A Klein**.  The Insect's Final Dream. *Chicken in a Snowstorm Press* (2017).  2018 Exhibits: Kohler Art Library, Madison, WI; Athens Art Exhibition, Athens, GA. |
|  | **A Klein**, KA Klein.  Hugo Bristol and the Night Sky.  *Chicken in a Snowstorm Press* (2013). |
|  | **A Klein**.  [CTHRU: A composition-based taxonomy of information graphics.](https://medium.com/@binarybottle/cthru-a-composition-based-taxonomy-of-information-graphics-c57dd419e8b4#.q92v4hoo6)  *Medium* (2016). |
|  | **A Klein**, W Bevington. "Information visualization" entry in: Erlhoff Michael, Marshall Tim, eds.  [Design Dictionary: Perspectives on Design Terminology.](https://link.springer.com/referenceworkentry/10.1007/978-3-7643-8140-0_302)  Basel, Boston, Berlin: Birkhauser Verlag (2008). |
|  | A Keshavan, **A Klein**, B Cipollini.  [Interactive online brain shape visualization](https://doi.org/10.3897/rio.3.e12358) (*2015 Brainhack event)*  *Research Ideas and Outcomes* 3: e12358 (2017). doi:10.3897/rio.3.e12358 |
|  | **A Klein**, A Worth, J Tourville, B Landman, T Dal Canton, SS Ghosh, D Shattuck.  [An interactive tool for constructing optimal brain colormaps.](https://mfr.osf.io/render?url=https://osf.io/h7rpk/?action=download%26mode=render)  *40th Annual Meeting for the Society for Neuroscience (2010).* |
|  | **A Klein**. [Data-visual relationships to subject performance and eye movements](https://dx.doi.org/10.3897/rio.2.e8814)  (2007 NSF proposal). *Research Ideas and Outcomes*. 2: e8814 (2016). doi:10.3897/rio.2.e8814 |
|  | **Holography**  Since the time I built a basement optics lab with a friend in high school to create holograms, I have been making display holograms and conducting research on 3-dimensional display technologies, at the University of Southern California, the University of Michigan, and at the MIT Media Laboratory. For my thesis work at MIT, I created the deepest dispersion-controlled viewing stations, and the thinnest edge-lit holograms, both of which use a hologram to present specially controlled light sources (pre-distorted wavefronts or pre-dispersed light) to a second, display hologram for sharper and deeper images. Since then, I have formulated a general raytracing equation for holograms. Holography has influenced my later research in surprising ways. |
|  | **A Klein**.  [Relating vector ray-tracing equations for holograms of arbitrary shape and thickness.](https://mfr.osf.io/render?url=https://osf.io/68vtn/?action=download%26mode=render)  *Journal of the Optical Society of America A*. 25(4): 979-983 (2008). |
|  | MA Klug, **A Klein**, W Plesniak, A Kropp, B Chen.  [Optics for full-parallax holographic stereograms.](https://mfr.osf.io/render?url=https://osf.io/jhze2/?action=download%26mode=render)  *Proc. SPIE*. 3011 (78) "Practical Holography XI" (1997). doi:10.1117/12.271340 |