**1. Emerging Memory Devices (Ch. 2)**

Highlighted categories include:

* **Novel magnetic memories**: STT‑MRAM, SOT‑MRAM, VCMA‑based MRAM
* **Resistive memories**: OxRAM, CBRAM (filamentary/non‑filamentary)
* **Ferroelectric memories**: FeFET, FTJ (leveraging HfO₂’s ferroelectric property)
* **Macromolecular memory** (e.g., flexible polymer-based)
* **Mott memories** (based on insulator–metal transitions)
* **Massive storage** concepts (e.g., DNA-based)  
  Each has strengths—e.g., MRAM for speed endurance, ReRAM and FeFETs for analog compute, DNA for density.

**2. Emerging Logic & Information‑Processing Devices (Ch. 3)**

Three major groups:

* **CMOS extensions**: nanowire/nanosheet FETs, CNT‑FETs, 2D material FETs, TFETs
* **Charge-based Beyond‑CMOS**: NC‑FETs, NEMS switches, MottFETs, topological insulator devices
* **Non-charge-based Beyond‑CMOS**: spin‑wave devices, excitonic devices, transistor‑lasers, magnetoelectric logic, domain‑wall logic, Spin‑Torque Majority Gates  
  These offer alternate state variables—spin, phase, photons—and new switching mechanisms.

**3. Device‑Architecture Interaction (Ch. 4)**

Focuses on how these devices could enable novel computing paradigms:

* **Neuro-inspired systems**: ReRAM/PCM/ECRAM, ferroelectrics, MTJ-based neural nodes, photonic weight multiply
* **Probabilistic computing**: stochastic MTJs, Josephson junctions, ReRAM
* **Dynamical systems**: oscillators (ring, spin-torque, metal-insulator transition, optical, electromechanical)  
  These architectures break from Boolean/von-Neumann models and leverage device physics directly.

**4. Emerging Materials Integration (Ch. 5)**

Investigates the materials needed to realize these devices and integrate them with CMOS:

* 2D semiconductors (e.g., TMDs) for high-mobility channels
* Ferroelectric HfO₂ integration
* Novel interconnect materials chosen via ML-driven screening
* Transient/fading electronics for security and eco-friendly disposal.

**🔍 My Take**

* **Diversity**: The roadmap spans a rich tapestry of device types—magnetic, ferroelectric, resistive, spintronic, photonic, mechanical, and molecular.
* **Depth**: It doesn’t only catalog devices—it connects them to system-level paradigms (neuromorphic, probabilistic, oscillatory computing).
* **Integration challenge**: Real-world adoption will hinge on integrating exotic materials into standardized CMOS flows—a recurring theme.